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of the

AMERICAN ASSOCIATION
of
NURSE ANESTHETISTS

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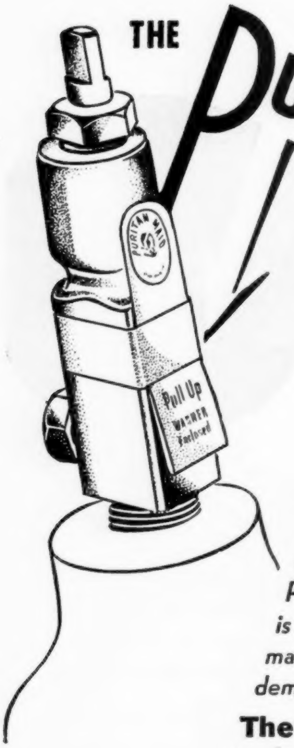
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BULLETIN OF THE AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

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The Bulletin of the American Association of Nurse Anesthetists

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THE CONTENTS

THE ART OF ANESTHESIA

TEMPLE FAY, M.D., F.A.C.S.
Professor and Director of the Departments of Neurology and Neurosurgery,
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Read at the ninth annual meeting of the American Association of Nurse Anesthetists, held in Atlantic City, September 15-19, 1941.

The aspect of anesthesia which I have been asked to discuss cannot be measured in terms of apparatus and *pressures,* nor are there *chemical formulas,* contraindications or hazards connected with its use. Unfortunately, there has been little attempt to standardize, and practically no attempt to dispense, the psychological values dealing with reassurance and the patient's morale, as a preoperative prerequisite, which, in my opinion, is frequently the deciding factor between "good" and "bad" anesthesia.

In our clinic, problems of brain surgery involve not minutes, but hours; five to seven hours are frequently required for a single operation. The problem of shock, postoperative pneumonia and circulatory instability is even greater than that usually encountered by the general surgeon, because the neurosurgeon must deal directly with the "vital" centers of the brain and nervous system. It is therefore imperative to prevent shock, maintain the patient's comfort, and select an appropriate anesthetic for the purpose.

In spite of long periods under ether or other anesthesia, the incidence of postoperative pneumonia is almost nil in our clinic. Serious states of shock during or after operation have been prevented and corrected by measures that we have devised. As our anesthetist is an important co-partner in these preparations and observations, we have considered in addition to the technical knowledge required, that she should know the meaning of *pulse pressure;* how blood volume, water balance of the body and shock are interrelated, and what intracranial pressure and circulatory changes may be expected, from the drugs and anesthetics used. The accomplishment of this added factor of safety belongs under the general heading, "The Art of Anesthesia."

For more than eight years, it has been customary to request our anesthetist (Miss Florence Schwab) to suggest the appropriate combination of drugs and anesthetics best suited to each patient and to the operative procedure contemplated. Here, the anesthetist is not merely "giving an anesthetic," but is in reality *sharing* with the surgeon the important half of the responsibility as to the conduct of the operation, wherein success or failure may lie. The surgeon's skill and ability often may be offset by the patient's lack of cooperation. The anesthetist's insight and understanding of the human mechanism usually determine whether the operation goes smoothly or not. This "Art of Anesthesia" is not necessarily confined to a few "expert" anesthetists. It is in reality based upon certain fundamental objectives to be reached. *Firstly,* a quiet and comfortable "séance" from the standpoint of the patient, and *secondly,* a safe and satisfactory physiological state of circulation and tissue function for the surgeon to deal with.

The anesthetist should be one skilled in the art of robbing the patient of consciousness. As consciousness is

considered Nature's most jealously guarded attribute, it has been hidden carefully within the safety vault of the skull, apparently secure from the ordinary forces surrounding primitive man and the animal world. Our modern scientific knowledge and research have attempted to devise methods and substances which will steal upon the conscious centers, almost without the patient's awareness, and quickly silence them.

In order to bring about a peaceful and happy surrender, the warning systems of anxiety, fear, pain and discomfort must be rendered ineffectual, otherwise subconscious levels, known as "reactions of defense," will become so aroused that the immediate and remote effects will prevent a smooth operative and postoperative course. This requires, on the part of the anesthetist, an intimate knowledge of *brain physiology* and *circulation*, as well as technical skill. A reassuring personality and the ability to apply "vocal" anesthesia, when needed, are important considerations in the training of an anesthetist.

To render a patient submissive, the method too frequently takes the form of a sort of "blitzkrieg" of the conscious levels, by quick and overwhelming attacks of gas, drugs, or ether. This sudden and brutal onslaught upon consciousness is said to be justified by many, in order that the patient experience the least amount of suffering. The fears which may arise in the few brief moments of struggle often leave scars, deep in the personality and future reactions of the patient, which may exert themselves in many unfavorable manifestations, years after the wound has healed and the anesthetist and method of anesthesia have long since been forgotten.

A far better approach to the problem is an attack upon conscious levels by an insidious method of propaganda, using sedation and reassurance to the proper degree, in order that the final moment of anesthesia or analgesia may be a simple process of passing from a state of relaxation and languor into one of almost natural sleep, following the first few moments of the appropriate anesthetic.

Suffering and *pain* are relative concepts of an intellectual order. They are easily "conditioned" so that when associated with fear and anxiety, the response is far greater than when diversions of consciousness occur and the attention is directed to other matters. We are all familiar with the observation that children, laughing and running about at play, frequently cut or injure themselves without recognition of pain or discomfort. Later, when attention is called to the bleeding or contused area, they immediately become aware of pain and may suffer intensely. If the same wound were inflicted deliberately, while the child was being restrained and yet able to see what was going to happen, the screams of pain and terror would be ample evidence of the psychic quality of pain response. In each instance the injury or stimulus might have been the same, but the difference between *laughing at pain* and *screaming from pain* is produced by "conditioning" of the mental state by many circumstances. The importance of this simple fact cannot be overestimated if a "good" state of anesthesia is to be obtained.

In the management of children who are being subjected to surgery, the general feeling is that because an infant cannot speak, suffering is therefore less intense. This is not true. We must recognize that psychic trauma is actually produced in the child during the harrowing moments preceding operation, an experience which is forced upon it because you and I may decide it is necessary for

the maintenance of its general physical health. On busy clinic days, the surgeon may not have time to reassure the child, or even make friends, prior to the insult which is contemplated upon both the tissues and the conscious mechanism of the patient. The anesthetist may be required to go from one case to the next, without time to allay fears, or to reassure anxious hearts caused by new and strange surroundings. It may be true that it is best for all concerned that the screams of the victim be silenced as quickly as possible, but usually the patient surrenders only after every fiber of his being has been exhausted, fighting the overwhelming onslaught of the gas or ether.

As the child gradually returns to consciousness there is in addition to the nausea, pain in the wound and soreness in the throat. Exhausted and wet with sweat, from a prolonged state of subconscious anxiety and fear, the first visual impressions (after a T. and A.) are usually associated with blood on the pillow or bleeding from the nose and mouth. Here, the postoperative pain is reinforced by visual confirmation of physical injury sustained, and no amount of reasoning or reassurance then displaces the minutes and hours of emotional and mental stress, that without apparent justification are permitted to occur until the patient has recovered from the effects of the anesthesia.

It is my opinion that the anesthetist's responsibilities *exist from the moment of contemplated operation until the patient is free from the effects of the anesthetic.* Daily pre- and postoperative rounds to the wards and rooms of the patients should be required in order to evaluate the prospective candidate for surgery, or follow up the results of an anesthetic previously administered.

As there is scarcely a branch of surgery that does not have its regrettable catastrophes, there is no excuse for endangering human life simply because the service or hospital is so large that individual patient-anesthetist contacts cannot be made, or because there are not enough anesthetists to permit increasing the demands upon their time. There should be included in the training period of the anesthetist, a full share of responsibility for the pre- and postoperative care of the patient, if the best results are to be obtained by all and the outcome of the anesthetic fairly evaluated.

The anesthetist frequently receives the blame for an anesthetic failure when the surgeon may have poorly prepared the patient for the operation. On the other hand, the surgeon's reputation often hangs in the balance if the anesthetist does not understand the management of her patient, no matter how much she may know of apparatus and anesthetics.

Dr. Charles H. Frazier, Professor of Neurosurgery, and my former Chief at the University of Pennsylvania Hospital, was among the first to employ female anesthetists in his clinic. The anesthetists of America owe him recognition for his pioneer work and also for the emphasis which he placed upon the "art" surrounding the preparation and postoperative care of the patient. He and Dr. George Crile of Cleveland, were close friends, and we are all familiar with the so-called *anoci-association* (pain and shock prevention) technique which Dr. Crile developed for goiter patients, before the days of Lugol's Solution. Operations upon the toxic thyroid patient were then considered dangerous procedures and every effort was made to allay anxiety and control excessive nervousness. So perfect was this preparation and technique

that I have seen Dr. Frazier "steal" a goiter from an excessively nervous patient without the slightest suspicion on the part of the patient that a major surgical procedure had been accomplished.

In some instances the mention of operation or signs of preparation would be enough to send the pulse to 160, the temperature to 103, and the patient into a state of collapse. It was necessary, therefore, that every detail of hospital routine be fixed in advance. A sterile hypodermic was given each morning, followed by a trip to the operating room floor for a "treatment" by the anesthetist, who gave slight whiffs of oxygen from a formidable looking apparatus. Breakfast was given after the "treatment." The patient became accustomed to this harmless procedure, as well as the change of surgical dressings to the throat.

When the "treatments" had reached a point that the patient no longer feared the trip to the operating room floor, the breathing apparatus or the anesthetist, then, the "test" was alternated by adding a small amount of nitrous oxide, along with the oxygen into the fake apparatus. The patient, a little dazed, recovered to find the anesthetist saying, "I think the treatment may have been a little strenuous today. That's enough, we will try it again tomorrow." The patient, pleased to find no change in physical state, was soon visited and reassured by the resident physicians and praised for the satisfactory response to the treatment!

Thus, the anesthetist was able to fully evaluate the problem and indicate the type and amount of sedation and anesthesia required for operation. The morning of the operation saw no change in routine except morphine instead of sterile water was given by hypodermic at the time of the former treatment. The patient dropped off quietly in response to the gas in the apparatus, convinced that all would be well. Immediately, however, ether was added to the gas, and the patient quickly transported to the operating room, where the goiter was removed.

After applying the same type of dressing to the neck, the patient was again returned to the exact position and under the same circumstances that existed before operation. The anesthetist resumed the same position as on former "test" occasions, and with the aid of oxygen, consciousness was restored. The anesthetist again reassured the patient as he became partially conscious, and told him that there would be no need for further treatments, as it would be best to rest for at least a day or two. The patient's dressing was identical with that which had been applied for one week or ten days before the operation. The patient returned to the ward or room under identical circumstances similar to the previous preoperative details. Breakfast was offered but usually refused.

The postoperative effects which the patient noted, particularly the soreness in the throat, were treated by swabbing a weak solution of quinine to the back of the throat. This transferred the patient's attention away from the wound, and with proper sedation, the postoperative period was without anxiety or shock. I recall, on several occasions, the patient's indignation when more than a week later he discovered the fresh scar on the neck, not realizing that an operation had actually been performed.

I have drawn in detail the picture of what was possible, over and over again in thyroid surgery, under conditions where the patient, the anesthetist and the surgeon all played a part in making safe recovery possible. The direction of the pre- and postop-

erative campaign fell upon the shoulders of the anesthetist, and much credit for developing this "art" of proper management should go to Miss McGuire and Miss Goff, of the University Hospital staff.

This "Art of Anesthesia" is being forgotten or disregarded today. Too much stress is being placed upon "new methods": valves, apparatus, pressure, tanks, tables, connections, gases and formulas, with operative schedules that must be maintained. Just because the human being "can take it" is no reason to disregard the value of tender and constant care of the patient's feelings and his tissues as well. This is not just a question of "unconsciousness" or third-stage anesthesia, it is a matter of good understanding of the patient, before, during, and after the operation.

What can we do today to offset this loss of an important "art" in a field that is becoming complicated and specialized? The anesthetist holds the key to life and death, as well as to the failure or success of many operations upon which the surgeon's reputation may hang.

The program which we have adopted in our clinic combines much of what Dr. Frazier and Dr. Crile have emphasized. I have frequently pointed out that the successful outcome of many of our neurosurgical procedures is due to the management of the patient by the *anesthetist*, and the reassurance that has been given to me by one who knows the meaning of pulse pressure and thus can foretell accurately the state of affairs regarding circulation and shock, even though conscious levels and reflexes may be altered by tumors or lesions in the brain, or by the surgery itself.

We undertake the first step in anesthesia the day before operation, and have practiced giving the patient chloral and bromide, in appropriate doses, the night before operation, along with food and reassurance. Early on the morning of operation, chloral and bromide are repeated by mouth. This is followed within one-half hour by an hypodermic of sodium phenobarbital, 2 grains (adult dose). The patient then becomes drowsy and relaxed so that in most instances, avertin, 50 milligrams per kilogram, is found to be sufficient to maintain a three to five hour operation. Evipal intravenously, gas, or ether can be added if required, during the operative procedure, but in almost every instance the patient remains dull and drowsy, whereas, this slow and fractional method of "multiple sedation" does not alter the circulation and blood pressure, but induces a state suggestive of normal sleep. In addition to the anesthesia administered, when painful skin areas are encountered, the patient is fortified by injections of appropriate local anesthetics. To many, this may sound redundant, but here lies a secret which we have found extremely profitable. When the patient is not "hurt" or tormented by pain in the subconscious levels, there is no fall in blood pressure or stimulation of sweating responses which may promptly precipitate the problem of shock.

Without going into the details of *surgical shock*, it is recognized that the loss of fluid from blood volume and circulation, is, in reality, one of the chief causes of this dangerous condition. The anesthetist must be alert for *sweating* and estimate the amount of water lost into the blankets, as this rapid loss of fluid from the tissues and the blood may be the forerunner of disaster, if not promptly recognized. At times, concealed fluid loss into the stomach may escape attention. The theory of "splanchnic dilatation" and laking of blood into

the abdominal viscera, is only part of the problem of surgical shock and probably not as important as is usually believed, unless direct loss of fluid or blood from the wound has also taken place.

The anesthetist should have some reliable guide to reassure her at all times. To this end, a pre- and postoperative study has been made on more than five thousand patients in our clinic. Blood pressures have been taken by appropriately trained nurses or doctors, often enough to establish an acceptable average, prior to the operative intervention. Blood pressure is taken every five to fifteen minutes, if the patient's condition is serious. It is our custom to require fourth-hour readings, as a routine, throughout the patient's entire stay in the hospital. This is omitted only when the patient may be asleep. From accurate blood pressure readings, the pulse pressure may be obtained (subtracting the diastolic from the systolic reading). With pulse pressure determined and charted, (irrespective of the systolic or diastolic reading) we believe a *safety index* can be established.

Normal pulse pressure may be considered as 40 millimeters of mercury, from childhood to late adult life. Pulse pressures between 30 and 50 millimeters of mercury may be considered "within the range of normal." *When pulse pressure rises above fifty*, it should be viewed as a warning that a state of cerebral anoxia is arising, or is present, which demands consideration. The cause may be, (a) failure of cerebral circulation; (b) increase of intracranial pressure; or (c) insufficiency of oxygen reaching the brain because of any local, mouth, intermediate, tracheal, or pathological lung obstruction.

Pulse pressure of 30 or below, indicates failing peripheral circulation in terms of diminished blood volume or vasodilatation. This latter is the forerunner of disaster and the companion of surgical shock. (Blood volume may be relatively diminished if the vessels dilate, so that there is insufficient blood to fill them).

With these rules at hand, it is obvious that the anesthetic, when pulse pressure is 50 or above, should be one that is not associated with properties which might cause edema of the brain or an increase in intracranial pressure and consequent additional anoxia. Ether, therefore, is particularly to be avoided: nitrous oxide must be carefully administered and if no contraindication exists, "dehydration" or spinal drainage will decrease the risk of postoperative vomiting, stupor and many unfortunate postanesthetic effects. Phenobarbital helps to reduce arterial hypertension and thus could be used to advantage in the hypertensive patient.

Where *pulse pressure* is 30 or below, the blood volume may be considered insufficient for normal tissue and organic function. Diastolic pressure must not be allowed to fall below 60 millimeters of mercury, as oxygen delivery to the capillary bed and tissue cells then becomes inadequate. As the tissue and organs begin to fail, death may be close at hand. Transfusion, infusion or support of vasomotor tone is required immediately, and if necessary, shrinkage of the vessels by vasospastic drugs, in order to permit the diminished amount of blood to fill the vessels adequately. Pressure may thus be temporarily restored to the capillary bed and function retained.

The best vasospastic drugs are pitressin and ergot. It must be remembered that although ephedrine and adrenalin are important in bringing about temporary improvement of vasomotor tone and pressure, they

also have the undesirable effect of speeding up the heart rate. Caffeine sodium benzoate may be a dangerous stimulant, unless it is clearly established that circulation is failing from the cardiac standpoint. Too frequently the heart is already working furiously to maintain blood in the arteries and hence blood pressure, but it is not able to secure sufficient blood from the returning venous circulation to fill the vessels. To increase its rate is not to increase its efficiency. This is like running a motor boat with the propeller out of water. It is obvious that speeding up the motor, under these conditions, would only ruin the motor. So, too, if caffeine sodium benzoate is given to a heart that needs blood volume to work on, and not stimulation, it will quickly wear it out.

Inadequate blood volume in the vessels, or returning to the heart, can be caused by three primary factors: (1) direct loss of blood; (2) loss of clear plasma fluid (sweating, edema, effusion, et cetera); and (3) sudden dilatation of the vessels, causing stasis and laking, or dilatation so great that even normal amounts of blood are not sufficient to fill the vessels and maintain a working pressure. If the anesthetist will keep a careful watch over *pulse pressure* at five-minute intervals, the trend of the pulse pressure above 50, will be recognized and appropriate measures instituted before serious symptoms of *cerebral edema* arise, which are so disastrous in certain cases.

When pulse pressure begins to fall below 30 and pulse to rise in rate above 120, the anesthetist should check excessive sweating (atropine); have vasospastic drugs (pituitrin, pitressin, ergot, ephedrine) ready to give; and suggest to the surgeon the need of intravenous fluid, transfusion, or hypertonic glucose. Do not wait until the pulse is soft and thready or the blood pressure fails. Heroic measures then will be required and often to no avail. Here the "Art of Anesthesia" can be adjusted to patients by a rule that we have found reliable and reassuring to the anesthetist. Each patient naturally becomes a separate problem. If, however, pre- and postoperative records are carefully kept, with the above possibilities in mind, the anesthetist will soon be able to distinguish the increased pulse pressure, often found preoperatively in the hydrated or elderly hypertensive types and be on guard against giving excess of fluids, before, during, or after the anesthetic to be selected. On the other hand, the thin, emaciated, or subnormal type of patient indicates the need for adequate fluid, to prevent rapid depletion of the small margin of safety that exists in the tissue storage and prevention of circulatory collapse or shock.

Finally, the "Art of Anesthesia" concerns the pulse. Again, I wish to present a rule which we have found of importance regarding the rate. The normal heart should beat (on its own intrinsic mechanism) at about 120 per minute, if it were relieved of all nerve influences. When the pulse rate rises to over 120, some extrinsic stimulation from the sympathetic nervous system is active, and a reason for the increase should be sought in one of the following conditions: (1) Falling blood volume and pressure; (2) excitement, anxiety and fear; (3) fevers and infection. The blood pressure and pulse pressure will indicate the first, and the anesthetist can easily observe the others. Anxiety and fear must be met with reassurance of the patient before operation, and with the proper sedation; infections and increase in temperature must be known to any interested observer and ruled out before operation. The rising

pulse rate is therefore usually a warning of impending fall in blood volume.

When the pulse rate reaches 130 or over, fluids, blood, plasma, acacia, glucose or some sustaining mixture must be added to increase blood volume in order to control the patient's pulse. Vasoconstricting drugs will help to shrink the vessels temporarily to meet the falling volume and hold the pressure. If the surgeon is creating pain, which in turn, is associated with anxiety, fear or excitement on the part of the patient, thus causing a rise in pulse rate, the anesthetist is warned to increase the general analgesic requirements. Pulse rates below 120, indicate that the vagus nerve tone is active, and when heart rates below the normal are encountered, such as 60 per minute, they indicate vagal irritation and need not concern us here, excepting that it is a clue to existing increase in intracranial pressure, or the possibility of central brain pathology. Low pulse rates in general should be viewed as a sign of intracranial pressure or edema, and treated accordingly.

It is important, however, to realize that the normal heart rate is a compromise between the depressing effect of the vagus, and the stimulating effect of the sympathetic system on the heart. The heart response may be analogous to the automobile where the vagus is the brake and the sympathetic system the accelerator. If you remove the brake (vagus) the pulse tends to rise to 120. We all know that atropine paralyzes the vagus, and hence the anesthetist should realize that if sufficient atropine had been given to the patient, a rise in pulse rate to 100 or 120 may be expected and considered as "normal," but when the rate reaches above 130, an undesirable change has occurred in the patient's condition, requiring activity of the sympathetic nerves. Thus, an accelerator effect upon the heart is required to speed it above 120, and this fact should be a warning that something beyond the stage of simple adjustments has occurred.

A final word regarding morphine. This drug relieves pain, but produces edema of the brain stem. Respirations are depressed by the intrinsic edema, which is not reversible for many hours. Ether enhances edema of the brain at the cortical levels. There is, therefore, a possibility of respiratory failure if the patient already has an increase in pulse pressure added to the edema from morphine and retention of fluid in the body tissues by means of atropine, (curtailment of sweating). Atropine gained its popularity as a counterpart to morphine through its effect on pulse. It was obvious that morphine produced brain-stem edema, vagal irritability, and a fall in pulse and respirations; atropine merely by releasing the heart rate and thus improving the circulation temporarily, aided the clinical symptoms of depression. The addition of atropine to offset the effects of morphine is a false friend in view of the fact that the intrinsic brain-stem edema caused by the morphine is irreversible, and adequate measures must be instituted to overcome its dangerous effects. Adjust the dosage of morphine carefully to each patient, and avoid its use whenever possible.

The use of morphine is never permitted in our neurosurgical preoperative work, and even codeine has its limitations. In the presence of increased intracranial pressure, I have seen respiratory failure follow the administration of one-quarter of a grain of codeine. Those who indulge in the "easy" methods of relief of pain and preoperative preparation, by means of morphine, will lose the occa-

sional patient from causes which cannot be established by the anesthetist or the surgeon and which are frequently put down erroneously as a heart or brain catastrophe!

Surrounded as our work is with its many hazards when dealing directly with the brain and nervous system, over periods of many hours, we have been forced to develop and maintain, to a high degree, the "Art of Anesthesia." Our inability to use morphine and ether safely in spite of their overwhelming benefits, should emphasize to you their definite dangers. When used in the presence of high pulse pressure, disaster often overtakes the patient, for no apparent reason. The anesthetist and the surgeon are often in constant fear, lest a sudden catastrophe occur again!

Time has demonstrated that we may dispel much of the fear of the "unknown" by a preoperative study of pulse pressure. Shock and its cause may be treated intelligently, during and after operation, if due regard be given the *pulse rate* and *pulse pressure*. It may be timely and reassuring to have a guide as to the state of the patient's circulation, when things go badly, and I am sure you will find in *pulse pressure*, indications for the same type of assistance that the compass brings to the mariner. If understood and properly used, even difficult courses end in "Happy Landings."

Along with the machine and the chemical age, which temporarily dominates our point of view, the need for constant emphasis of the human side of the problem will continue to bring forth those who will develop the "Art of Anesthesia" in contradistinction to the "technically perfect" anesthetist.

VENTRICULAR FIBRILLATION

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INTRODUCTION. The normal mammalian heart has the property of originating within itself, without the aid of any external stimulus, the impulse which initiates each heart beat; in other words, the mammalian heart has a certain rhythmicity. The sinus node initiates the impulse and is called the pacemaker of the heart. From the sinus node, the impulse spreads over the musculature of both atria and passes from the atria to the ventricles via the A-V node and the bundle of His. Within the ventricles, the bundle of His divides into the right and left bundle branches which terminate in the network of Purkinje.

Because of such an orderly spread of impulse, the different myocardial fibers, far from entering into contraction in a haphazard fashion, contract in a fixed and efficiently prearranged manner. The atria contract before the ventricles. Within the atria as well as the ventricles, there also exists a fixed pattern of impulse spread. Such a mechanism results in a synergic and efficient contraction of all the ventricular fibers, producing a forceful ventricular systole sufficient to overcome the pressure that exists in the aorta and pulmonary artery, and to expel an adequate amount of blood into those vessels.

When the myocardial fibers of the

atria, instead of contracting synergically, enter into contraction in a haphazard fashion, the condition known as atrial or auricular fibrillation results. When the same situation exists in the ventricles, we are dealing with ventricular fibrillation.

In short, ventricular fibrillation may be defined as an anarchic, disorderly and useless contraction of the ventricular fibers. As a result, no blood is expelled into the aorta and the arterial blood pressure abruptly falls to zero. The different organs of the body do not receive any blood and die, sooner or later, according to their individual requirement of oxygen and other nutrient materials.

CAUSES OF VENTRICULAR FIBRILLATION. Ventricular fibrillation can be induced by an adequate electrical stimulus [1], [2], [3], [4], [5] directly applied to either right or left ventricle. By "adequate" is meant a condenser discharge, a direct or alternating current of sufficient duration and strength, which, if short, must be applied at the proper moment of the heart cycle. It is evident that, if the stimulus is applied on the skin, as in cases of electrocution, instead of directly on the heart, the electrical stimulus has to be stronger to overcome the resistance of skin and body tissues. Figure I shows the initiation of ventricular fibrillation in a dog's heart.

Chloroform is known to be a dangerous anesthetic because, among other drawbacks, it may induce ventricular fibrillation in a heart which before anesthesia seems perfectly normal. Levy first emphasized that danger of chloroform and pointed out that light chloroform anesthesia is particularly dangerous;[6] therefore the induction of chloroform anesthesia is a critical stage as is the recovery from chloroform anesthesia. During chloroform anesthesia, especially if light, the administration of adrenalin is dangerous and often results in fatal ventricular fibrillation.

The administration of adrenalin during benzol inhalation is another way of producing ventricular fibrillation [7], [8]. In the dog, under sodium barbital anesthesia, the intravenous injection of 0.02 milligrams of adrenalin per kilogram of body weight, is a very reliable method of initiating ventricular fibrillation.

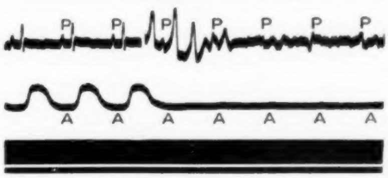

FIG. I

Ventricular fibrillation initiated by a short direct current stimulus (0.04 second) applied on the left ventricle of a dog during the "vulnerable period."

Upper curve, electrocardiographic tracing lead III. Lower curve, left intraventricular pressure curve. The persistence, during ventricular fibrillation, of the P waves in the electrocardiogram and of the A waves (due to auricular contraction) on the tracing of the intraventricular pressure curve, shows that ventricular fibrillation does not disturb the auricular rhythm.

During cyclopropane anesthesia, several types of cardiac arrhythmia may develop and possibly ventricular fibrillation[9]. If adrenalin is administered during cyclopropane anesthesia, ventricular extrasystoles, ventricular tachycardia, and ventricular fibrillation are known to occur[10], [11]. Figure II shows the initiation of ventricular fibrillation in a dog under cyclopropane anesthesia, by the intravenous administration of adrenalin.

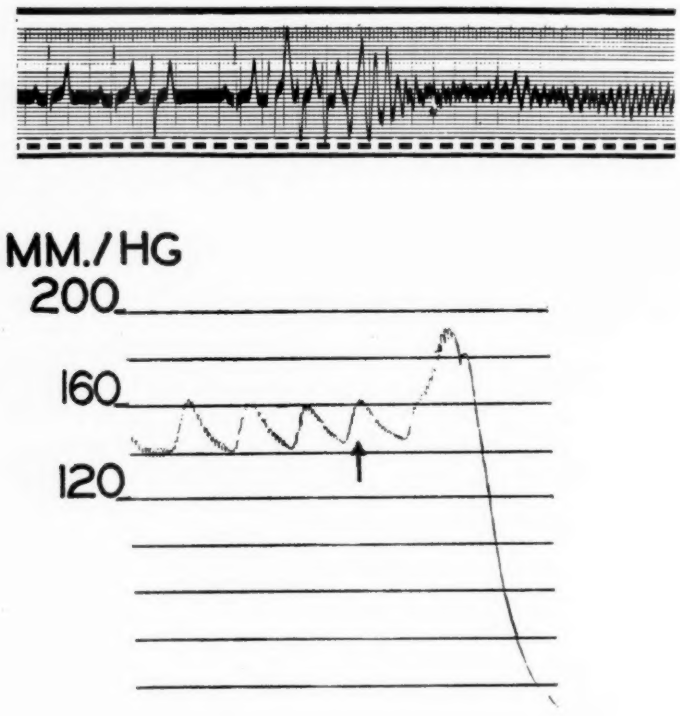

FIG. 2

Ventricular fibrillation induced in a dog by the intravenous injection during cyclopropane anesthesia of 0.01 milligrams of adrenalin per kilogram of body weight.

Upper tracing, electrocardiogram lead III. Lower tracing, mean carotid blood pressure.

At the arrow, adrenalin was injected.

Several drugs, in therapeutic doses, protect the ventricles against fibrillation, but induce ventricular fibrillation at toxic dosage. Digitalis, ouabain[12], potassium chloride[13], procaine hydrochloride[14], quinidine sulfate and papaverine hydrochloride[15], the last three of which protect the heart against ventricular fibrillation, may induce fibrillation in toxic doses.

The ligation of a coronary artery, an experiment which is duplicated in clinical cases of coronary thrombosis and coronary embolism, eventually produces ventricular fibrillation.

EVOLUTION OF VENTRICULAR FIBRILLATION. As soon as ventricular fibrillation starts, the arterial blood pressure falls to zero. Ventricular fibrillation begins with an initial stage, very short, during which a coördinated contraction wave spreads rapidly and repeatedly over the ventricles; afterwards a stage of

incoördination sets in, characterized by electrocardiographic deflections irregular in form and voltage; finally all activity ceases in the ventricles after a variable time, a few minutes to sometimes half an hour[16]. During ventricular fibrillation, the auricular rhythm remains undisturbed.

In the human being, once fibrillation has started, the heart never returns naturally to normal rhythm. A few cases of recovery from ventricular fibrillation have been reported, but it seems that in a normal heart, true fibrillation, i. e., fibrillation which is beyond the first stage, never reverts to normal rhythm. The same holds true for the dog's heart. The cat's ventricle is different and can come out of fibrillation spontaneously and start beating normally. Such spontaneous recovery from fibrillation is shown in Figure III.

REVIVAL FROM VENTRICULAR FIBRILLATION. In 1933, Hooker, Kouwenhoven and Langworthy revived the method of stopping ventricular fibrillation by short runs of alternating current.[17] Wiggers and Wégria modified the method and applied it to the dog's heart[4, 5, 14, 15]. They used a 60 cycles per second alternating current of about 3 amperes and 0.10 second in duration, that they sent through the fibrillating ventricles by applying padded electrodes directly around the ventricular myocardium. Sometimes one such application brings the heart out of fibrillation, sometimes two to ten or more

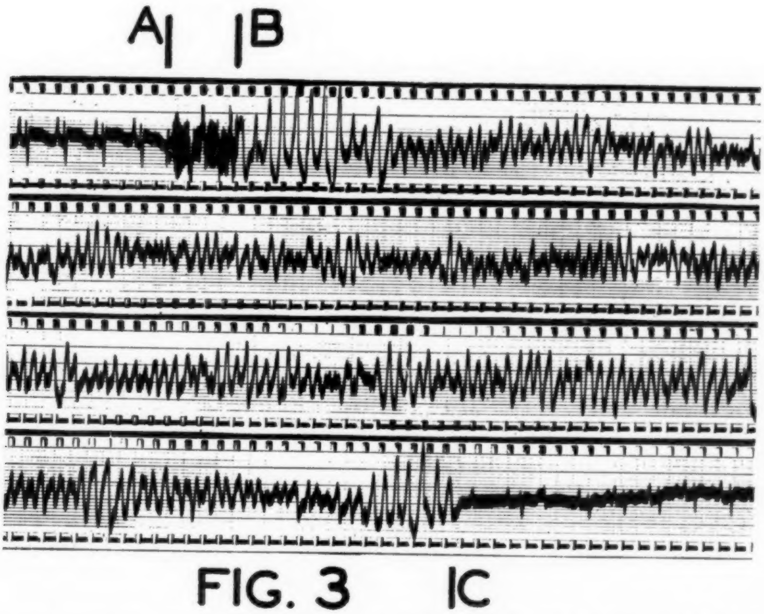

FIG. 3

Continuous electrocardiograph tracing, lead III, of a cat whose ventricles were thrown into fibrillation by an application of strong alternating current from A to B. At C, ventricular fibrillation stopped spontaneously and normal sinus rhythm was resumed. Notice that throughout the record, fibrillation always remains of a very coarse type.

applications are required. The sooner the reviving shock is applied, the better the chances of stopping fibrillation. With such method, Wiggers and Wégria succeeded in reviving the same dog from fibrillation an average of fifteen times over a period of eight hours; in the best experiment, forty-two revivals of the same dog occurred within twelve hours.

Although the method has been used successfully by Beck in reviving human hearts from true fibrillation,[18] the problem of reviving the human heart is not as simple as it may seem for many a good reason. First, the human heart is larger than the heart of dogs, the dogs used in experimentation generally weighing 10 to 15 kilograms, and it is difficult to stop the fibrillating process in the depth of a heavy heart. On the other hand, experimentation on large animals has shown that, if an attempt were made to revive the human heart by applying the electrodes, not directly on the heart, but for convenience on the outside of the chest, a too strong and damaging alternating current would have to be used. Therefore if the alternating current is going to be useful, it must be applied directly on the ventricles. This of course requires the opening of the chest under artificial respiration; under such circumstances, by the time the heart is reached and ready to be worked upon, all the organs of the body, and one thinks specially of the nervous system and the heart itself, have had plenty of time to undergo severe and irreversible injury.

Furthermore, most cases of ventricular fibrillation occur after coronary occlusion and Wiggers, Wégria and Pinera have shown experimentally that it is impossible to revive such a heart from fibrillation,[19] unless the occlusion is released and blood massaged through the ischemic area.

In conclusion it must be said that, at the present time, revival from ventricular fibrillation has little practical application and is reserved to rather unusual cases, such as cases of electrocution, and patients whose heart fibrillates during cardiac surgery. Therefore it seems that efforts should be directed toward prevention of ventricular fibrillation rather than its cure.

PREVENTION OF VENTRICULAR FIBRILLATION Many methods have been devised to test the effect of different factors such as drugs on the susceptibility of the mammalian ventricle to be thrown into fibrillation. (For more details, see reference[14].) The first question is the choice of an adequate experimental animal. The cat's ventricle comes spontaneously out of fibrillation, probably because it very seldom goes into complete fibrillation, which may mean that the cat's heart is, in some aspects at least of its physiology, somewhat different from the human heart. The dog's ventricle seems to be physiologically closer to the human ventricle. The use of the dog as experimental animal has its drawbacks, however. Up to now, none of the experimenters on ventricular fibrillation, whatever test was used, quantitated the susceptibility of the ventricle to fibrillation in the same animal before and after the effect of a drug. All the methods used consisted in statistical analysis of experiments on groups of control animals and groups of animals treated with the drug under study. This is due to the fact that no use was made of the method of stopping ventricular fibrillation, revived by Hooker, Kouwenhoven and Langworthy.

Furthermore, the different tests used to induce fibrillation were not 100 per cent reliable as methods for producing fibrillation and one could

never be entirely sure whether the failure to induce fibrillation was due to the administration of a possibly preventive drug, or to the occasional failure of the method used to produce fibrillation. While, in such circumstances, the results obtained were sometimes strongly suggestive, they were not wholly conclusive.

In 1940, Wiggers and Wégria designed a new test,[14] making it possible (1) to produce fibrillation in 100 per cent of the trials made on normal dogs; (2) to quantitate the sensitivity of the ventricle to fibrillation, and (3) to do this repeatedly on the same dog. They showed that a short direct current stimulus will never produce fibrillation unless strong enough and applied during the last 0.04-0.06 second of ventricular systole. They termed this period the "vulnerable period" of ventricular systole and they called "fibrillation threshold," the strength of the weakest short direct current stimulus just sufficient to induce fibrillation. They demonstrated that such a fibrillation threshold, repeatedly determined on the same animal over a period of five to six hours, the animal being revived with the alternating current method, need not vary, if a few simple precautions are taken.

Using that method, Wiggers, Wégria and Pinera showed that, in experimental coronary occlusion, the fibrillation threshold is tremendously reduced;[19] if, once fibrillation is induced, the occlusion is released and blood massaged through the ischemic area, such a heart can be revived with the alternating current method and after a recovery period, the fibrillation threshold comes back to its normal control value.

In clinical cases of coronary occlusion, the clinician is very often faced with the alternative of giving or refraining from giving digitalis to a patient going into myocardial failure, because digitalis, although indicated for the myocardial failure, is reputed to increase the risks of a fatal ventricular fibrillation. In that respect, Wégria, Geyer and Brown demonstrated experimentally that therapeutic doses of digitalis or ouabain do not change the fibrillation threshold of the dog, although in toxic doses they do produce fibrillation.[12]

Procaine, adrenalin and papaverine proved to have a protective action against the induction of ventricular fibrillation.[14, 15] The question whether quinidine sulfate protects the mammalian ventricle against arrhythmias in general and fibrillation in particular, is still a much debated question, although many clinical reports tend to show that quinidine is beneficial. Yet many experimental as well as clinical studies conclude to the contrary, or at least conclude that quinidine is of no value. A very thorough study led Scott to consider quinidine as having definite preventive and curative properties in ventricular tachycardia.[20]

In experimental studies, Wégria and Nickerson showed that quinidine protects the dog's ventricle against the arrhythmias induced by administration of adrenalin during cyclopropane anesthesia.[21] Furthermore, they showed that quinidine raises the fibrillation threshold of the dog's ventricle and protects it against the fibrillation induced by the combination benzol-adrenalin. However, if the dose of quinidine is sufficient to significantly lower the blood pressure of the animal, the fibrillation threshold is not increased. From their experiments, Wégria and Nickerson conclude that quinidine, when properly administered, is a drug of value. Up to now, however, no drug has been found to render impossible the induc-

tion of ventricular fibrillation by electrical stimulation.

CONCLUSION. Prevention of ventricular fibrillation rather than cure seems to be the goal that we should try to reach; yet in most clinical cases in which ventricular fibrillation is feared, i. e., in cases of coronary thrombosis, it is doubtful whether an active drug can reach the ischemic area in a high enough concentration to have a beneficial effect.

The alternating current shock method of curing fibrillation may be useful: (1) if it is promptly used; (2) if it is applied to proper cases, i. e., cases in which fibrillation has been induced by some physiological cause (electrocution for example), rather than organic lesion, as coronary thrombosis.

In cases of fibrillation due to coronary occlusion, the alternating current shock method will not be of any value until it is possible to remove the occlusion promptly (thrombus, embolus) and re-establish an adequate circulation through the ischemic part of the myocardium.

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AN APPARATUS FOR THE ADMINISTRATION OF PENTOTHAL SODIUM-OXYGEN ANESTHESIA BY ONE ANESTHETIST

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Read at the ninth annual meeting of the American Association of Nurse Anesthetists, held in Atlantic City, N. J., September 15-19, 1941.

Pentothal sodium intravenous anesesia is being administered to increasing numbers of patients each year. In some clinics it has practically displaced all other anesthetics.[1,2] Its field of usefulness is being widely expanded so that workers are now using it with success in fields in which it was formerly felt to be unsuitable.

One of the drawbacks to the wider use of pentothal sodium intravenously is that it usually requires two anesthetists to administer the anesthetic. One sits at the head of the patient holding the chin, watching the respirations, and perhaps administering oxygen. The second anesthetist sits by the arm board or foot board and holding a needle into the vein, delivers the anesthetic in fractional doses from a 20 cc. syringe. There are few hospitals which have a sufficient number of anesthetists; far less have enough to allow two persons to be assigned for one anesthesia. In order to overcome this difficulty, I have devised an apparatus from material which was available in our hospital and laboratories. (Fig.1). It is composed of a No. 20 gauge, 1½ inch intravenous needle; a glass observation tube; 30 inches of small gauge special rubber tubing such as is used in a continuous spinal anesthesia apparatus; a stopcock; and a 50 cc. Luer-Lok syringe which will fit the stopcock. A stand which will fasten onto any operating table is used, and attached to the stand is a swivel-jointed burette holder which permits the syringe to be clamped at a convenient height or angle.* When the apparatus is used with the patient's arm held to his side, we have found that there is less chance of dislodging the needle if it is inserted toward the patient's head and the tubing then curved back on itself by means of a piece of metal suitably fashioned. This is fastened to the patient's arm with adhesive tape.

In the use of the apparatus the 50 cc. syringe is filled with a 2½ per cent solution of pentothal sodium, made by mixing thoroughly 40 cc. of sterile water prepared for intravenous use with 1 gram of pentothal sodium. The needle used for aspirating the mixture into the syringe is then discarded and the stopcock and tubing are attached. All air is removed from the system and the stopcock is closed. When this is done the apparatus is carried to the patient and the syringe is clamped in its holder. An Adams arm board is used if the arm is to be abducted[3]. In this case the arm is fastened to the board with a wide strip of adhesive tape, and the injection is usually made into the cubital veins. If the arm is being kept at the side, one of the forearm veins or the antibrachial cephalic vein is used. With the arm at the side, the needle is inserted proximally and the metal gadget is used to prevent the curved tubing from pulling the needle

*The complete apparatus may be purchased from the George P. Pilling Company, Philadelphia, Pa.

out of position. Once the needle is well seated in the vein, the anesthetist injects sufficient pentothal to clear the needle of blood. It is then strapped in place with adhesive. If the arm is abducted, it is our custom to drape the patient for operation before the needle is inserted. If the arm is fastened by the side, the patient is draped as a rule after the venipuncture is completed.

The anesthetist then sits at the patient's head and commands the patient to count slowly, at the same time injecting about 3 to 5 cc. of the drug. The injection is continued slowly and by the time the patient has counted to fifteen he will usually be asleep. Oxygen can then be administered by the use of the conventional anesthesia mask or by an oropharyngeal catheter such as that of Waters. If no mask is used, a butterfly of cleansing tissue on adhesive tape is placed over the nose so that the amplitude of the respirations can be seen readily. Once the correct depth of anesthesia is obtained it is maintained by giving a minute injection every 30 seconds or so. By so doing we have yet to have a needle clot while in the vein, besides which the patient is maintained at an even anesthesia. We now induce the patients rapidly and almost never see the needle become dislodged. This is undoubtedly due partially to the skillful placing of the needle.

We are at present training our nurse anesthetists to use and be familiar with this device. The surgeon or one of his assistants introduces the needle and the nurse anesthetist takes over from there. Dr. W. P. Morrill of the American Hospital Association informs me that he believes the same legal principle would apply to the administration by nurse anesthetists of intravenous anesthesia as presently applies to the administration of inhalation anesthesia. Certainly many thousand intravenous

FIGURE I

Apparatus for the administration of pentothal sodium-oxygen anesthesia by one anesthetist

anesthesias are being administered by nurse anesthetists today, and next year will see this number greatly increased.

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DENTAL ANESTHESIA

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Read at the ninth annual meeting of the American Association of Nurse Anesthetists, held in Atlantic City, N. J., September 15-19, 1941.

The title of my paper is descriptive, but nevertheless I want to go on record as objecting to differentiation between a general anesthesia and anesthesia for dental or oral surgical work. There is no difference except:

1st: That the latter is more difficult due to imperfect control, i. e., operating in the mouth while using only a nasal airway for the anesthetic agent.

2nd: If the dentist is dextrous, and the operation short, there is no need for leveling off and complete saturation.

With the above facts in mind, there is no reason why the following discussion should not apply to any anesthetic. Bear in mind that anesthesia means a physical state in which it is possible to operate painlessly. Above all, the dentist is interested in the following:

1st: The patient's reaction to the anesthetic.

2nd: Sufficient relaxation to operate.

Taking No. 2 first:—The ability to operate. We all realize that some procedures require absolute relaxation and quiet, such as probing for a minute root tip, or careful excision and suturing, while others, such as removing a tooth with forceps, will allow considerable motion or even squirming on the part of the patient. If this is a result of analgesia instead of anesthesia, however, the patient should be mentally prepared previously.

The most important factor from my viewpoint is the patient's reaction. A perfectly given anesthetic that the patient does not like can be classed as a failure. If the patient says he or she felt the removal of a tooth, all your explanations as to feeling it, but having no pain, are inadequate. As in a good department store, the patient is always right. We prosper by what the patient says about us.

With this in mind I will cover some of the psychological aspects of nitrous oxide and oxygen anesthesia. It should start with an office pleasant and restful to the eye, and a demeanor that gives the patient a feeling that you are experienced and adequate to take care of the anesthesia. You should be well-groomed, neat but not gaudy, not too frivolous and not too alarming. If you are "unfortunate" enough to be very attractive and "sexy," then adopt certain maneuvers to impress people with your professional ability. Take preoperative tests with a professional air and be detached in your relationship with

EXODONTIST — PATIENT — ANESTHETIST

1—Right Maxillary
Patient at Exodontist's Shoulder

2—Right Mandibular
Patient at Exodontist's Elbow

PATIENT'S POSITION

1. Chin elevated
2. Hands clasped
3. Feet uncrossed
4. Chair tilted

ANESTHETIST'S DUTIES

1. Administration of anesthetic
2. Protection of opposite lip
3. Elevation of chin
4. Seating of the nasal inhaler

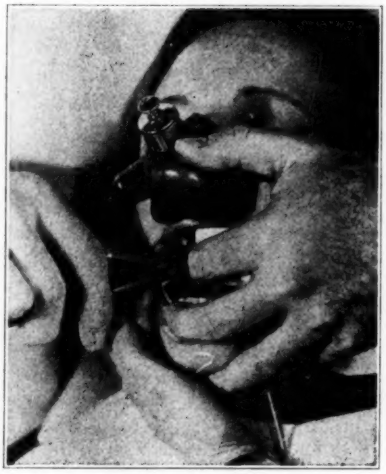
Anesthetizing machine to the right rear of the Anesthetist.

FUNCTIONAL USE OF ALL THE DENTIST'S LEFT FINGERS AND THUMB

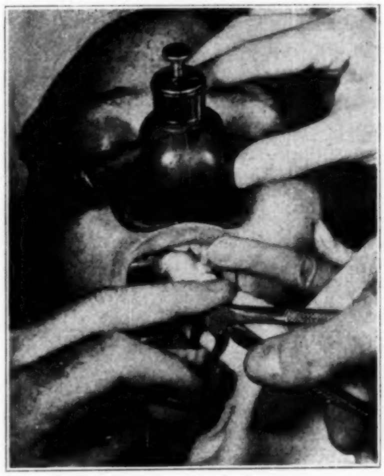
THE CO-ORDINATION OF THE DENTIST'S AND ANESTHETIST'S HANDS.

3—Right Maxillary

4—Left Maxillary



5—Right Mandibular



6—Left Mandibular

ADVANTAGES:

1. **Bracing of the forceps by a thumb or finger**
2. **Protection of the opposite lip by anesthetist's finger**
3. **Elevation of the patient's chin**
4. **Correct seating and control of the nasal inhaler**
5. **Isolation of the operative field**

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the patient. However, if you are the "nurse" in every sense of the word, a little softness and, should I say, personalized service for the patient should dispel his fears of your coldness, for professionalism always seems to be just that. Above all, your sex (female) is an integral factor in your patient-and-anesthetist relationship.

The drawbacks to dental anesthesia are many:

1st: The patient is ambulatory and treats the removal of a tooth as a casual experience, to be gotten over with during a lunch hour, so he can be back in the office, et cetera. The anesthetic is never figured on. To premedicate, unless for minor oral surgery, is never expected by the patient.

2nd: A dentist cannot sign a death certificate. This is unfortunately important. A death and the coroner and newspaper publicity never help one's practice or the profession as a whole. To never have a death is obvious, or to share an office with an obliging M.D. who will quickly sign a death certificate, is also easy and sounds trite. Seriously, I suggest preoperative tests, with the results made a part of the patient's record. While experience is the best teacher and gives us judgment, professional men must start with little experience. I myself practiced ten years judging anesthetic risks by trial and error. Then I started preoperative tests and instead of giving nitrous oxide and oxygen to 85 or 90 per cent of my patients, I cut it down to 60 per cent. Maybe I scare more easily, but when I found a low vital capacity, very fast pulse, doubtful blood pressure, or short breath holding ability, I felt it was fairer to the patient who wanted

to walk in and out to moderate my anesthetic or substitute another.

If the unfortunate dentist who has an anesthetic death is able to produce for the inquest the results of tests given, I am sure the jury will be more favorably impressed than with a statement, such as—"Well, the patient seemed like a good risk to me." This more particularly holds true with the younger men.

In experimenting with preoperative tests I found that the "Vital Capacity Test" was a more accurate measurement of the patient's condition at that moment than many other tests. Preoperative excitement will wreak havoc with a pulse rate or a blood pressure, while vital capacity[1] has a negligible variable due to excitement. This, plus the fact that it is easy to take, impressive, and yet reassuring to the patient, makes it ideal in a dental office where time is a factor. You may ask whether I adjust my anesthetic to the results of the tests. Most assuredly, for if I still give nitrous oxide to a patient with a low vital capacity, then I do so with a slower induction, generally following a conversation with the patient's physician. I have found many patients I would have considered normal to my eyes, turn out as doubtful after preoperative tests. So take tests and *write* down the results.

In talking to trained anesthetists I am limiting my paper to the allotted twenty minutes, therefore I am not discussing induction except where it covers the patient's psychological reaction.[2]

The ideal start is to talk with a patient and ask him about his previous anesthetic experience. If he has had none, make an interesting story about his coming experience; if he relates a history of previous anesthesias, find out what, if anything, was objectionable about them. Fear and a feeling of suffocation seem to top other objections.

I favor nasal induction only, because it dispels the fear of suffocation on the part of the patient. That is, I do not cover the mouth for the first few breaths, and I instruct the patient to breathe through the mouth if he feels a sense of suffocation. Also it conditions the patient to nasal breathing while I am operating in the mouth.

There are many hypnotic helps that will avoid unpleasant experiences. A consideration of the five senses and how each should be handled when anesthetizing a patient will illustrate my point.

Sound: In so far as the office is concerned, it should be quiet; no water should be running. I find a silent cuspidor an aid in keeping clean seatcovers on the dental chair. If the surgeon or the nurse talks, the tone should be confident, because it is much more reassuring to the patient. Also remember that hearing is the last sense to go and the first to return. Any irrelevant remark made prior to, or just after an extraction, may be heard by the patient, and too often these remarks are not intended for their ears.

Speech: Only one person should talk. The patient is apt to be confused if he has to listen to two people talking, especially if we are desirous of having the patient listen to what is being said. As the anesthesia progresses, the sentences should be short —often mere phrases. The ability of a person to follow you diminishes as he goes to sleep and if you want to be heard and understood, make it short, and slower, as sleep approaches.

Smell: The nose piece of the machine should be washed with an agreeably scented soap, and the surgeon and nurse should scrub their hands thoroughly with a delicately scented

soap. The days of having lysol penetrate a patient's consciousness to impress him with a sense of sterilization are over, I hope.

Touch: The quieting touch of a hand on the patient's shoulder or hand is an aid to quieting his nervousness. After all, the patient's greatest fear is of going into the beyond, or a sense of going somewhere beyond his control. This infinite feeling is dispelled by the finite touch to some portion of the body.

Sight: If the patient's eyes are open, do not request him to close them; allow them to remain as they are and smile at him reassuringly. Have a confident look and air, even though your feelings may not be in accord. Occasionally, in working under local anesthesia, I have made a grimace at some point, and regretted it; for the patient, though feeling no distress, asks, "What's the matter, Doctor, did something happen?" If our features were masked more often, the patient's impressions would be far better.

There are many stunts that can be employed to divert the patient, and a good one is as follows: Find out the patient's interest before administering the anesthetic and then, before the mask is adjusted, start talking. I would advise telling something that is interesting to him, sequentially, and not requiring his coöperation as to answers. Then, as the patient is anesthetized, stop the story (unless you work better talking to yourself); and as the patient is coming out of the anesthetic continue the story at the same point where you left off when he was going to sleep. The patient will, as a rule, tell you that he has followed you continuously and has not been asleep. This assertion oftentimes is difficult for you to disprove, unless you remember to show him the tooth you have removed and ask if he felt it. A few times I have had patients say they did not feel the tooth coming out, but they were certain they were not asleep.

Another helpful procedure is to always agree with the patient. By this I mean, in reality, do not contradict him. Contradictions are disturbing and may change the state of mind to the point where the patient becomes a problem. Everything I say to the patient after an extraction is what I term correct and constructive. I ask, "Did you enjoy it?" Not, "That didn't hurt, did it?" and "You had a pleasant dream?" Not, "What were you yelling about?"

Another aid to the operator is to have the patient's hands clasped and the fingers interlocked. During an anesthesia the patient frequently tenses his muscles and it is easy to see that the more he tightens, the more difficult it is for him to separate his hands. Naturally this saves you, for a pair of clasped hands are easier for you to manage than two wildly waving arms. I might explain that I use no straps, broad leather, web canvas or anything to hold a patient forcibly, other than my arms and those of the assistant. My reasons are obvious. Our work is judged by results. A perfect extraction with poor anesthesia makes you a poor dentist in the eyes of the patient. Just so a restraining strap that leaves its mark on the patient's body, an hour or a day later, makes you a brute, no matter if you weigh only one hundred pounds. I use only my own controllable force, for I know when to stop to avoid bruises, and in certain unmanageable cases I have been glad to stop in the middle of the work. Re-anesthetization or local anesthesia is then the method of choice. At the dental clinic, where broad leather straps are used, I have seen the back of the dental chair snapped.

Imagine that pressure reflected in a mark on the chest by the same strap.

Another important factor is to be exceedingly careful not to spoil your anesthesia by careless after-care. The patient waking up is a problem. If you use the before-mentioned method of story telling, fine! If not, and you have had a completely silent room, then gently talk to the patient. If there are no signs of awakening, raise your voice and shock the person with it. Occasionally the mention of the patient's name serves to bring him back to a sense of reality. Of course there is always the method of just allowing him to sit and awaken of his own accord, but sometimes this takes a while.

When the patient has awakened, and then only, take out the prop and the gauze pack; but be sure to say what you are doing. Frequently patients are dazed and imagine you are extracting the tooth—mentioning that you are taking out the prop, et cetera, will obviate this.

What should the anesthetist do to help a dentist while extracting a tooth?

First of all, the patient should be seated comfortably in a slightly tilted chair to make it easier to retain the body position. His feet should be uncrossed and his hands clasped. The anesthetist should always be to the left side of the patient and the gas apparatus to the left of the patient's head.

Next we have the action scene—I mean while the dentist is operating. We have four hands generally, two of the surgeon and two of the anesthetist. The forceps is held in one hand and so three hands must work out the following duties:

1st—Hold the chin up, to clear airway and prevent pressure on the tongue.

2nd—Keep the opposite lip protected from the forcep. Frequently the forcep will press against the opposite lip and cause a bruise.

3rd—Keep the nasal inhaler correctly seated on the nose to assure a good anesthesia.

4th—Regulate the machine.

5th—Isolate the operative field with gauze sponges.

When we add to this, sponging the operative field; handing the dentist sponges and getting rid of old ones; working on an occasional collapsed patient,—you can readily see the necessity for teamwork, and appreciate that both dentist and anesthetist are as busy as the proverbial one-armed paperhanger.

In my office, my anesthetist has the say as to when to operate and when to cease. She is following the respiration, and interference with it is a major concern of mine. When this happens, I stop operating or am requested to do so; and I immediately try to correct the situation.

Yes, after twenty years I am convinced that teamwork is an important factor in the successful anesthesia. Do not forget, however, that the patient is the final judge of your work. Cater to him and make him want to come back.

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ANESTHESIA IN THORACIC SURGERY

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The anesthetist who is interested in thoracic surgery must be thoroughly familiar with the mechanics of breathing. Before discussing anesthesia in thoracic surgery, let us review a few facts in regard to respiration. The following information will be found in any good book on physiology. Inclusion of such well established information in this paper is intended to serve only to recall important points which the anesthetist must constantly bear in mind in the study and practice of anesthesia in thoracic surgery.

Respiration

Respiration takes place as a result of the correlation of complex mechanisms, both physical and chemical. During inspiration the diaphragm contracts downward, increasing the chest cavity longitudinally, and the intercostal muscles contract, swinging the ribs outward, increasing the chest cavity laterally. The levatores costarum, pectoralis minor, scaleni and sternocleidomastoid are also instrumental in increasing the cavity during inspiration. During active inspiration the pressure within the chest becomes negative, which is less than atmospheric pressure (760 millimeters of mercury at sea level). The air rushes in via the nose and passes through the pharynx, larynx, trachea, bronchi, bronchioles and into the alveoli, where the interchange of gases takes place. Expiration takes place as the inspiratory muscles relax, allowing the chest to return to its normal position at rest. This creates a greater pressure within the alveoli than exists in the atmosphere, and the air is forced out into the atmosphere, thus equalizing the pressures.

Pulmonary ventilation is classified according to the following headings:

a) Vital capacity is the sum of the tidal, complemental and reserve air, which is about 3700 cc. It may be altered by posture, obstruction to air passages, weakness of respiratory muscles, diminished activity of the respiratory center, or lack of surface contact in the alveoli.

(b) Tidal air is that taken in on normal respiration, which is about 500 cc.

(c) Complemental air is that taken in on a forcible inspiration following a normal respiration, which is about 1800 cc.

(d) Supplemental air is that which can be forcibly expired after normal respiration.

Each lung is invested with an exceedingly delicate serous membrane (the pulmonary pleura), which is arranged in the form of a closed invaginated sac. A portion of this membrane covers the surface of the lung and dips into the fissures between its lobes. The remaining portion of the membrane lines the inner surface of the chest wall, covers the diaphragm, and is reflected over the structures occupying the middle of the thorax. This portion is termed the parietal pleura. The two layers are continuous one with the other around and below the root of the lung. In health they are in actual contact; the potential space being known as the pleural cavity. The pleural sacs are entirely separate, the only communication being through the bifurcation of the bronchi. The space between the lungs and beneath the sternum is termed the mediastinal space.

The pleural pressure must be regarded as the force which acts upon the surface of the lungs and counteracts their elastic tendency to collapse. During respiratory rest it is kept negative by the resultant of two static forces: (1) the inward pull of the expanded elastic lung; and (2) the outward pull exerted by the tonic contraction of the respiratory muscles. During inspiration several dynamic forces are added, among them the extra force created by the expansion of the thorax and the descent of the diaphragm, the resistance of the lung tissue to deformation, and the difference in alveolar and atmospheric pressures. In adults, according to Aaron, the pressures in the pleural cavities amount to from -3 to -6 millimeters of mercury during normal inspiration. A deep inspiration may reduce the pressure to from -30 to -40 millimeters of mercury. If the thorax is opened, the negative intrapleural forces cannot be brought into play; consequently, the lung does not inflate. In surgery one or both pleural cavities may be in contact with outside air through small openings, producing partial unilateral or bilateral pneumothorax of varying degrees. Due to the fact that the thoracic viscera are mobile, any change or alteration of the intrapleural pressures may cause movement of the mediastinal structures. If there is an undue degree of motion, these vessels become engorged, anoxemia develops, circulation fails, and death occurs.

Premedication

Drugs that tend to depress breathing to any extent are contraindicated in thoracic surgery. A sufficient tidal volume must be maintained to take care of body needs and this may not be possible with drugs such as avertin, which may depress respiration 20 to 40 per cent. Such drugs may also abolish the cough reflex for a long period of time after the anesthetic has been discontinued. It is essential that the cough reflex be established as soon as possible after the operation is completed, in order to prevent secretions from collecting in the trachea which would interfere with the proper interchange of gases. There is danger also that these secretions may pass into the other lung and spread the infection.

Choice of Anesthetic

The choice of the anesthetic agent in thoracic surgery depends upon the surgeon and the operation. Spinal anesthesia is of little value, but local anesthesia may be used for extrapleural operations of short duration. A gas machine should always be available, in the event that the pleura is opened accidentally.

In considering the relative values of the inhalation anesthetics—nitrous oxide, ethylene, cyclopropane and ether—several factors must be taken into consideration. Nitrous oxide is non-irritating, but unfortunately it is not potent enough to produce sufficiently deep anesthesia for major thoracic surgery unless supplemented with ether, local, or a basal anesthetic. If given alone, the resulting anoxia puts too great a strain on an already impaired circulation and the respiration is labored and difficult. A small amount of ether added to the nitrous oxide-oxygen mixture is less harmful to the patient than a prolonged period of sub-oxygenation.

Ethylene is somewhat more potent than nitrous oxide and therefore deeper narcosis can be established with sufficient oxygen to meet the needs of body metabolism. It is still not potent enough, however, to meet all the requirements of thoracic surgery and it may be necessary during certain stages of the operation to

complement it with a small amount of ether.

Cyclopropane has largely replaced ethylene and nitrous oxide for this type of surgery because in its administration a rich mixture of oxygen can be given with a degree of narcosis sufficient for this type of surgery, without the addition of ether or heavy basal premedication. Dr. Beecher feels that cyclopropane is contraindicated in thoracic surgery and therefore at the Massachusetts General Hospital ether vaporized with oxygen is the anesthetic of choice. Ether and cyclopropane are the only inhalation anesthetics potent enough to allow the rich mixtures of oxygen that are so often required for this type of surgery. A combination of nitrous oxide plus oxygen plus ether can be used, however, and is probably preferable to ether-oxygen in that the total amount of ether administered may be cut down materially. Regardless of what anesthetic is used, the anesthetist must remember that in the face of a low vital capacity and greatly impaired circulation, pulmonary ventilation is the first consideration.

Intratracheal Method

Some surgeons prefer to have an intratracheal catheter in place for all thoracic operations. This can be done more easily by the direct method through the mouth. The advantages of intubation are as follows:

(1) To establish a free airway
(2) To facilitate the use of positive pressure when necessary
(3) To permit aspiration of secretions
(4) To abolish coughing by making closure of the glottis impossible.

It is not necessary to intubate the patient for extrapleural operations such as thoracoplasty. Probably the greatest advantage of the intratracheal tube lies in the fact that pus and secretions can be aspirated directly from the trachea. In many cases frequent aspiration is necessary during the operation to prevent infection of the opposite lung as well as interference with the interchange of gasses. The catheter should be left in place after the anesthetic has been discontinued, until the secretions are aspirated, and the patient is able to cough up any material that may accumulate.

General Considerations

When the thoracic cavity is opened, the major load of the interchange of gases is carried on by one lung and the proper functioning of this lung may be handicapped severely by the shifting of the mediastinum and the diseased lung to the opposite side. The patient is usually lying on the unaffected side, consequently this may add further strain. The anesthetist should anticipate when the surgeon is about to open the pleura, and to protect against a sudden collapse of the lung and a swing of the mediastinal structures toward the good lung, a slightly positive pressure should be built up in the breathing system. Unless this is done, large areas of the lung will be atelectatic until such time as positive pressure can be established to reinflate the collapsed alveoli. Adjustment of the respiration may take several minutes, but if the differential pressures are compensated for properly, by means of positive pressure, there is no reason why the patient should suffer from diminished pulmonary ventilation when the pleura is open. The amount of positive pressure necessary to keep the lung expanded may vary from 4 to 12 millimeters of mercury and the degree of inflation can best be judged by viewing the lung. In the lobectomy operation the surgeon may be handicapped for space and it may be difficult to pack off the other lobes, in

which instance after the respiration has been established the pressure may be decreased, allowing about one-third of the lobes to become atelectatic. At frequent intervals, however, the surgeon should give the anesthetist an opportunity to re-expand the lung. Unless this is done, the lung if allowed to remain collapsed over a period of time may become edematous.

When the pleura is open, labored breathing may develop, as a result of the damming of the carbon dioxide in the body. Unless the carbon dioxide is allowed to escape, it will be held in the form of carbonic acid, producing acidosis postoperatively. If breathing is labored, the patient perspiring excessively, and the blood pressure raised, the positive pressure should be released and the intermittent pressure given by means of rhythmic manual pressure on the breathing bag. This will allow the expirations to pass through the soda lime, which will absorb the carbon dioxide, and at the same time the lung will be prevented from collapsing by the increased pressure on inspiration.

Increased positive pressure is not as important in pneumonectomy. The lung on the affected side is already inactive, and once the respiration is adjusted to the pneumothorax and the lung ligated, it is necessary only to stabilize the mediastinum, thus avoiding respiratory and circulatory disturbances caused by a shifting mediastinum.

In extrapleural operations, if an opening in the pleura is made accidentally, unless the pleura can be closed by the surgeon, a larger opening should be made and positive pressure used to keep the lung inflated. Small openings in the pleura may greatly embarrass the respiration because there may be a valve-like action of the pleura on inspiration and expiration. In this case air would be sucked into the chest, the edges of the pleura would close on expiration and the consequent building up of pressure on the one side would be extremely dangerous.

When the pleura is within the last stitch of being closed, a suction tip should be inserted into the cavity to extract as much air as possible, while the anesthetist reinflates the lung cautiously. This will prevent large patches of atelectasis from developing postoperatively, and will assure better pulmonary ventilation after the anesthesia is discontinued.

In these operations shock may invariably be anticipated, and a cannula should be inserted into the vein before the operation is started. Intravenous solutions should be administered throughout the operation, complemented by blood if necessary. When the patient is returned to bed he should be placed on the affected side.

SUMMARY

1. A review of the mechanics of breathing is given.
2. Drugs that depress the respiration should not be used preoperatively.
3. The various anesthetic drugs are evaluated for thoracic surgery.
4. Advantages of intratracheal anesthesia are brought out.
5. Slight positive pressure should be built up in the breathing system before the pleura is open.
6. Positive pressure, 4 to 12 millimeters of mercury, should be used when pleura is open.
7. If lung becomes atelectatic, the surgeon should give the anesthetist an opportunity at frequent intervals to re-expand the lung.
8. If patient shows signs of an accumulation of carbon dioxide,

intermittent pressure by means of rhythmic manual pressure on the breathing bag should be used.

9. Small openings in the pleura may produce a tension pneumothorax as a result of the valve-like action of the pleura on inspiration and expiration.

10. Atmospheric air should be withdrawn from the cavity when the pleura is almost closed, to prevent atelectasis postoperatively.

11. Intravenous solutions should be administered throughout the operation, complemented by blood if necessary.

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DEFENSE BONDS PURCHASED BY ASSOCIATION

On November 18, 1941, United States Defense Bonds, Series F, totalling $962.00 (maturity value $1300.00) were purchased as an investment for the Trust Fund, as provided for in the original Trust Fund Resolution.

From the general fund the Association also purchased on January 13, 1942, one Series F Defense Bond at a cost of $3700.00, maturity value $5000.00.

IMPORTANT

In future please send all dues to American Association of Nurse Anesthetist Association Headquarters, 18 East Division Street, Chicago, Ill., instead of to the Treasurer, checks or money orders payable to the American Association of Nurse Anesthetists.

DEPARTMENT OF EDUCATION

(Continuing Symposium on The Administration of Cyclopropane)
(First Section, published in November, 1941 issue)

From: Department of Anesthesia, Ravenswood Hospital. Chicago.

To start the induction, the exhaling and the shut-off valve on the face of the mask are closed, and the bag is filled with oxygen. The mask is placed on the face, the shut-off valve is opened, and 300 cc. of oxygen per minute and 500 cc. of cyclopropane per minute are allowed to flow into the breathing bag, with the mask fitted tightly to the face. The flow of cyclopropane is decreased after three minutes to 300 cc. per minute for two minutes, then to 100 cc. per minute. This mixture — 100 cc. cyclopropane, 300 cc. oxygen — is continued (but not to exceed ten minutes) during the induction, or until a sufficient depth of anesthesia has been reached to allow the operation to begin. The cyclopropane is then turned off for one minute and resumed at the rate of 100 cc. per minute, at which level it may be left, turning it on and off alternately for fifteen or twenty minutes or until sufficient equilibrium between the anesthetic in the tissues of the body (the blood, and the lungs) and in the machine has been reached. From this stage cyclopropane may be added as needed. If ether is necessary to produce relaxation, it is usually added five or six minutes after the cyclopropane has been started. It is continued for three minutes, then both ether and cyclopropane are turned off for one minute. We do not use ether and oxygen without the cyclopropane flowing at the same time.

After breathing becomes sufficiently stimulated to indicate an accumulation of carbon dioxide, which is usually within four to six minutes after the anesthetic is started, the soda lime filter is used, turning it on full. If the filter is not turned on early enough, there is a marked increase in blood pressure; however, we have found no evident ill effects from the increased blood pressure. The soda lime cannister is filled to the top, and it should be changed after six or seven hours' service.

After the fascia is closed the cyclopropane is discontinued, the bag is emptied, and nitrous oxide and oxygen are given until the operation is completed.

As a precaution against explosions, great care is taken with each anesthesia to insure the absence of any leak in the system. The bag, mask and breathing tubes are wetted thoroughly before each anesthesia, and care is taken to maintain a relative humidity of 55 per cent or more in the operating room. Also a wet towel is placed on the patient's head to cover the hair, which is dry and full of electricity.

MAE B. CAMERON

From: Department of Anesthesia, Barnes Hospital, St. Louis, Mo.

The technique of administration of cyclopropane in this hospital is designed with special provision for two of the outstanding characteristics of that gas, viz:—(1) its high inflammability in the concentrations at which it exists in the anesthetic mixture during conventional clinical administration; and (2) its toxicity if permitted to accumulate to high concentration in the anesthetic circuit during the course of its administration.

Defense against accident due to the first named characteristic (inflamma-

bility) revolves around meticulous observance of precautions which have been originated to prevent leakage of either the gas itself or of anesthetic mixtures of which it is a component, together with specific inhibitive measures designed to prevent accumulation of electrostatic charges in its vicinity to a possible ignitive intensity. Stated simply, in the chronological order of their execution as they take place in practical clinical administration (a) in the anesthetizing room during induction and establishment of surgical anesthesia, and (b) during the conduct of surgical anesthesia and de-anesthetization in the operating room, the procedures are as follows:—

PRELIMINARY

1. When prior to administration, a cylinder of cyclopropane is attached to the yoke of the anesthetizing machine (or when a cylinder already attached to the machine is prepared for usage) the cylinder valve is turned on, and immediately tested with soap suds and a lather brush. This is never omitted as an initial procedure, as very frequently a leak *does* develop along the valve stem when the cylinder valve is opened, which leak, if not identified and corrected, permits spillage of quantities of the gas which can constitute a dangerous hazard. Correction of such a leak is effected by properly tightening the nut which compresses the valve-stem packing. While a conventional wrench may be used, it is recommended that a proper sized "socket wrench" be provided for the purpose and always kept at hand for that exact usage.

2. After the integrity of the cylinder valve is verified, the connection between the cylinder and the seat of the yoke to which it is attached, is similary tested and no administration is ever undertaken until potential leaks at these two points have been specifically corrected. The procedure is followed at the beginning of every day's initial use, of either cyclopropane or ethylene.

3. The obturator valve located in the chimney piece of the face mask is then tested by tightly inserting a cork in its inlet at the mask, establishing moderate pressure of oxygen within the system, and then testing the obturator valve with soap suds. Similarly, the ether jar connections, breathing tube and breathing bag connections, as well as the breathing bag itself, are tested, and the breathing bag is patched if found to be punctured. After complete leaklessness of the closed circuit has been verified, the testing cork is removed from the chimney piece inlet in the mask.

4. If a "celluloid" face piece is to be used, it is inspected for cracks which may have been accidentally introduced since its previous use. We prefer such transparent face piece, as it affords direct vision to the nose and mouth area during administration for prompt identification of appearance of blood, pus, mucus, vomitus, et cetera. The connection between the face piece and its chimney piece is inspected and tightened if necessary. While a *metal* face piece is used by some for its purported "electrical bonding" value, it is to be noted that the effect of such conductive link is nullified by the nonconductive pneumatic cushion which exists between such face piece and the patient's face. Furthermore, a conductive face piece is unnecessary when a "Horton intercoupler" is used.

5. The pneumatic face cushion is tightly affixed to the face piece and is checked for proper inflation to yield leak-proof fitting to the contour of the patient's face. The anesthetizing machine is then ready for use.

INDUCTION

6. Before starting the anesthetic, the Horton intercoupler is connected to the operating table, the anesthetiz-

ing machine, the patient and the anesthetist, thereby directly bonding them into an electrically balanced intercouple. The terminal that is used for the anesthetizing machine is attached to the metal nipple of the soda lime cannister so that the intercoupler need not be disconnected when that cannister, as an integral part of the soda lime circuit, is transported to the operating room on the table with the patient. The fifth terminal of the intercoupler is left free for use to join within the intercouple an assistant anesthetist or a visitor if either is to occupy a place within the zone of greatest ignition hazard, either during induction or later in the procedure. (The zone of greatest hazard is the area around and below the mask and around and below the expiratory valve located on the soda lime cannister.)

7. Before the mask is applied to the patient's face, the expiratory valve and the obturator valve are closed, so that a leakless, closed, circle-filter breathing circuit is established. To provide for the patient's respiration during the placement and adjustment of the mask to the patient's face, the breathing bag is inflated to soft distension with a mixture consisting of 80 per cent nitrous oxide and 20 per cent oxygen (4 liters per minute nitrous oxide, 1 liter per minute oxygen), after which the nitrous oxide flow is turned off and the oxygen flow is reduced to 500 cc. per minute. The mask is then applied to the patient's face; at the same time the obturator valve is opened. (The reason for using nitrous oxide-oxygen rather than oxygen alone, is to eliminate conscious discomfort of the patient if the period of adjustment of mask to face becomes slightly prolonged in order to effect a completely leakless mask-to-face connection).

8. (a) If during several respirations a reduction in the distension of the breathing bag at expiration denotes loss of volume within the circuit (leaky connection or leaky face contact), a flow of 2½ liters of nitrous oxide is started to maintain volume for the momentary period during which necessary mask-to-face adjustments are carried out to effect complete leaklessness of the mask-to-face contact, (denoted by constancy of distension of the breathing bag). Immediately such leakless constancy of volume is definitely established, the nitrous oxide is discontinued and delivery of cyclopropane is inaugurated at the rate of 500 cc. per minute (oxygen having been continuously flowing at 500 cc. per minute, during the period of mask adjustment). If a completely leak-free mask-to-face contact cannot be established and maintained, neither cyclopropane nor ethylene is administered under any circumstance. No consideration of expediency could justify such an obviously hazardous procedure, should a preventable accident result. The induction dosage for children and weak, debilitated patients is 250 cc. per minute of cyclopropane to 500 cc. per minute of oxygen.

(b) If during the first few respirations which take place after the initial adjustment of the mask to the patient's face there is *no* reduction in the volume of the breathing bag contents, (denoting thereby that a leakless closed circuit is patent), cyclopropane is at once introduced into the circuit at the rate of 500 cc. per minute, together with the 500 cc. per minute of oxygen which have been continuously flowing from the moment of first placement of the mask on patient's face.

(c) Induction technique incorporating helium has been purposely omitted from this present outline, because at present relatively few anesthetizing machines are calibrated to deliver

both the small volume of that gas required for induction and during maintenance, and the larger volumes required during de-anesthetization. While the author of this outline uses helium during induction, maintenance and de-anesthetization, she realizes that, as is the case with most of the machines within her own institution, the majority of anesthetizing machines in the field are so calibrated that helium may be administered in only the larger volumes that are used palliatively during the maintenance stage, or routinely during the de-anesthetization.

(d) After the patient has been carried to the stage of unconsciousness, the mask-retaining strap is fastened and adjusted, and the administration is continued until the surgical zone of anesthesia is established and the patient has been placed in proper position on the table for the particular surgical procedure which is to follow.

(e) If a pharyngeal airway is indicated, the mask-retaining strap is unfastened, the obturator valve is closed, the mask is removed and laid face upward (in this position it will spill less of its contained inflammable anesthetic mixture, cyclopropane being heavier than air). Then the airway is introduced, the mask is replaced, and the obturator valve opened, the retaining-strap is again adjusted and complete leaklessness of the mask-face contact is verified before proceeding.

(f) If an endotracheal catheter is to be inserted (involving the use of an assistant for supporting the patient's head, manipulating the mouth gag, connections, et cetera), such assistant is coupled with the fifth terminal of the Horton intercoupler (which as noted has been purposely left free), before any further manipulations are undertaken. After the assistant is so intercoupled, the anesthetist closes the obturator valve and removes the mask. The assistant inserts the mouth gag and supports the patient's head while the anesthetist (who has meanwhile lighted the laryngoscope at a suitable distance from the immediate danger zone) inserts and makes exposure with the laryngoscope, introduces the catheter and removes the still lighted laryngoscope to a proper distance before "turning off" its switch. The intercoupled assistant connects the anesthetic circuit chimney piece to the catheter, simultaneously opening the obturator valve, whereupon the anesthetist inflates the tracheal balloon to proper distension for blocking escape of the inflammable anesthetic mixture. Catheters not equipped with tracheal balloons are not regarded as safe for use with cyclopropane or ethylene, where leakage of the inflammable anesthetic mixture between the catheter and the trachea would constitute a grave ignition hazard.

9. It is to be noted that while the initial flow of cyclopropane and oxygen during induction of anesthesia in a normal patient is at the rate of 50 per cent cyclopropane and 50 per cent oxygen, no such concentration is presented to the patient's respirations, as the cyclopropane so delivered becomes immediately mixed with and diluted by the considerable volume of nitrous oxide and oxygen already within the anesthetic circuit when the cyclopropane is introduced. While no practical means are clinically available for determining with accuracy the precise concentration of cyclopropane that does exist in the mixture breathed by the patient, either during the induction or surgical stages of anesthesia, proper observance of the patient's reaction to the progress of the administration of the anesthetic readily acquaints the anesthetist with any increase to improperly high con-

centration, and provides her with prompt indication for change in the rate of delivery of oxygen or cyclopropane (with or without helium) to establish the desired lower concentration of cyclopropane within the breathed mixture.

10. (a) If the induction and establishment of surgical anesthesia have been effected in an anesthetizing room, and if the anesthetized patient must be transported to an adjacent operating room for the surgery, (this is conventional procedure at Barnes), special precautions are observed to reduce the likelihood of an ignition accident in preparing for and during the transit. These procedures fall into two groups, one of them for use when the anesthetizing machine is of a type which permits detaching the soda lime circuit entirely from the machine (10 b, below); the other procedure for use when the soda lime circuit is a permanent part of the anesthetizing machine and cannot be removed for such protected transit with the patient (10 c, below).

(b) When the anesthetizing machine in use is of a design permitting detachment of the soda lime circuit, the following routine is carried out. After the surgical zone of anesthesia has been established, and the patient has been placed in position for the scheduled surgery which is to follow, the gas flows are discontinued in the following purposive order: the cyclopropane cylinder-valve is closed, but its control valve left open to drain the small volume which would otherwise be entrapped between its cylinder valve and the control valve; the nonflowing nitrous oxide cylinder valve is then closed but its control valve is opened to similarly release its entrapped gas; the oxygen cylinder valve is closed but its control valve left open. Then the carbon dioxide cylinder valve is closed, but its control valve is opened, so that it will drain into the machine as the last escaping gas, the volume of non-inflammable carbon dioxide which has been until then entrapped between its cylinder valve and its control valve. All control valves are then closed. The rubber delivery hose is securely blocked by pinching and folding it back tightly upon itself (or it may be securely clamped) to prevent any leakage of anesthetizing mixture through it from the soda lime circuit. The hose is then disconnected from the head of the anesthetizing machine, and the soda lime cannister is lifted from its anesthetizing machine bracket and placed (closely guarded and protected) beside the patient's head on the operating table. The entire assembly (operating table, patient, soda lime circuit and anesthetist, all still meticulously intercoupled) is then transported as one unit to the operating room.

(b) (continued) Upon arrival at the operating room, the soda lime cannister is lifted from the table and is affixed to its bracket on the operating room anesthetizing machine, thus bringing that machine into electrical couple with the anesthetizing group. Note that if by reason of difference in electrical potential between the two, a spark occurs at the moment of affixing the cannister to the machine bracket, such spark takes place at an area where at that time there exists no flow or leak or accumulation of the inflammable gas, and therefore without possibility of an ignition sequence. The rubber hose of the soda lime circuit is connected to the head of the anesthetizing machine, its flow blockage is removed, and oxygen is started at the rate of 500 cc. per minute. This dosage is increased or decreased as indicated during the progress of the anesthesia.

(c) When the induction and surgi-

cal zone of anesthesia have been effected in the anesthetizing room by use of a machine whose design does not permit removal of the soda lime circuit for separate transit to the operating room as a concise unit with the patient (due to the soda lime circuit being constructed as a fixed part of the machine itself), the cyclopropane cylinder valve and control valve are both turned off after the surgical zone has been established, and after the patient has been placed in position suitable to the particular surgery which is to follow.

It is to be borne in mind that in transporting such an extended group from the anesthetizing room to the operating room, the patient's terminal of the anesthetic circuit is on one transportation base (the operating table) but the machine end of the anesthetic circuit is on a different transit base (that of the anesthetizing machine itself). Consequently any difference in speed of transportation between the two, introduces severe strains on all connections of the anesthetic circuit, with increased possibilities of loosening those connections and introducing hazardous leaks. In one recent fatal ignition accident which occurred during such transport of the anesthetized patient to the operating room, it is suspected that the accident was due in some degree to some such factor.

MAINTENANCE

11. (a) During the conduct of surgical anesthesia in the operating room not only are the already stressed ignition precautions observed (prevention of accidental leakage, undeviating maintenance of balanced [intercoupled] electrical potential, and specific defense of the area of greatest hazard against invasion by non-intercoupled persons or objects), but also accumulation or increase of the cyclopropane to an improperly high concentration in the anesthetic atmosphere breathed by the patient is meticulously guarded against by continuous studied observation of the patient's reaction to the progress of the anesthesia.

Eliminating from this present outline of technique details of dilution by the incorporation of helium (for reasons set forth in paragraph 8 (c)), the desired and indicated dilution of cyclopropane tension in the breathed mixture to a non-toxic concentration is effected by increased delivery of oxygen, when, and to the degree indicated by the clearly recognizable signs of anesthesia evidenced by the patient.

(b) If during the course of a cyclopropane anesthesia it becomes necessary, by reason of supervening shock, to replace the *anesthetic* mixture by a *restorative* mixture (oxygen, carbon dioxide and helium) for inauguration of rescuscitative measures, the procedure is effected with meticulous regard for the temporary ignition hazard that is automatically introduced thereby. As the anesthetic mixture is expelled through the expiratory valve located on the soda lime cannister, the certainty is verified that no person or object not electrically intercoupled exists within the exact zone of "supervised spillage"; because the creation of a static spark of igniting intensity at that place could result in an accident. We consider it most important that such area be specifically defended until the expelled mixture is reduced below its ignition limit by diffusion into, and dilution by, room atmosphere. Adequate circulation of room air to facilitate such diffusion and dilution is made patent.

(c) At no time during the conduct of cyclopropane surgical anesthesia are any but "electrically balanced" persons permitted to enter the zone of

greatest hazard (around and below the mask, around and below the expiratory valve), or in close proximity to the anesthetizing machine itself. If a non-intercoupled anesthetist (or visitor) approaches the zone in question, she is first brought into electrical balance with the group before being permitted to enter it. This result is accomplished by attaching to such person the fifth terminal of the intercoupler, which, as before noted, has been left free for this purpose, (the coupling being effected at a safe distance from the zone, and always before the person enters it).

RECOVERY

Recovery procedures following cyclopropane (or ethylene) anesthesia are designed to eliminate the inflammable anesthetic mixture from not only the anesthetic circuit, but also from the patient's respiratory passages, before those vital areas are permitted to come into contact with the room atmosphere and the possibilities there for accidentally created frictional sparks that could be reached by the patient's exhalations. It is thought that a fatal accident recently reported in the literature, might possibly have been avoided if such protective precautionary technique had been employed. At Barnes Hospital the following procedures are executed at the conclusion of every anesthesia in which cyclopropane has been used:—

12. (a) After closure of the peritoneum, the cyclopropane cylinder valve is closed but its control valve is opened briefly, to release the small amount of that gas entrapped there, whereupon the control valve is closed.

Cyclopropane plus Oxygen

(b) If the anesthesia has been conducted with cyclopropane and oxygen alone (without ether), the patient requires anesthetic fortification during the period of cyclopropane displacement. Therefore, as the expiratory valve on the soda lime cannister is opened, *nitrous oxide* is started flowing at the rate of 2½ liters per minute (oxygen having been continuously flowing at the rate of 500 cc. per minute). To hasten replacement of the inflammable cyclopropane by noninflammable nitrous oxide, the breathing bag is completely compressed once —the cyclopropane mixture being thereby promptly expelled through the cannister expiratory valve. This spilling of the inflammable gas is vigilantly defended from intrusion by any non-intercoupled persons, both during the period of actual spilling and following it. After this first expulsion of gas by means of the described hand compression, the expiratory valve is immediately closed and the circuit permitted to fill with the nitrous oxide-oxygen mixture to normal distension of the breathing bag, whereupon the flow of nitrous oxide is discontinued, and the patient is carried for several minutes (closed circuit) on the nitrous oxide-oxygen mixture. The foregoing "emptying and refilling" is repeated at intervals of several minutes during the surgical closure, oxygen continuously flowing at 500 cc. per minute. Following this the intercoupler is disconnected upon completion of closure (but never before).

Cyclopropane plus Ether plus Oxygen

(c) If the anesthesia has been conducted with cyclopropane-oxygen plus ether, no anesthetic fortification is necessary during the "cyclopropane displacement" period. As the expiratory valve on the soda lime cannister is opened, *helium* is started flowing at the rate of 2 liters per minute, and oxygen is started flowing through the coarse oxygen control at 2 liters per minute, (the "fine" oxygen valve still flowing at 500 cc. per minute). The

contents of the breathing bag are emptied through the expiratory valve on the soda lime cannister by the already described single bag compression, the "spill" area being vigilantly defended against intrusion and static spark creation. After such emptying of the bag, the expiratory valve is closed quickly and the bag is filled with the helium-oxygen mixture to normal distension of the breathing bag, whereupon the flow of helium and the *coarse* flow oxygen are discontinued, ("fine" oxygen still flowing at 500 cc.). The patient is carried on the closed-circuit helium-oxygen mixture, (which contains some fraction of ether and cyclopropane which have diffused into it from the patient's tissues). The foregoing "emptying and refilling" is repeated at intervals of several minutes during the surgical closure. At the completion of surgical closure the intercoupler is disconnected (but never before).

(d) Upon the actual completion of the surgery (after skin closure), final de-anesthetization and brief prophylactic hyperventilation are effected as follows: The soda lime is cut out of the circuit (valve turned to the position which prevents contents of the circuit from passing through the soda lime) and the expiratory valve is opened. The fine control oxygen which has been flowing at the rate of 500 cc. is discontinued and in its place coarse control oxygen is started at 2 liters per minute, together with 2 liters per minute of helium and 400 cc. per minute of carbon dioxide (approximately 45½ per cent oxygen, 45½ per cent helium, 9 per cent carbon dioxide). The breathing bag is emptied *once* through the open expiratory valve, by hand compression as before described; whereupon the expiratory valve is then closed and the bag is permitted to fill with the flowing oxygen-helium-carbon dioxide mixture. Upon attainment of normal bag distension all gas flows are discontinued and the patient is permitted to breathe the closed-circuit oxygen-helium-carbon dioxide mixture until the desired depth of respiration is obtained. Then the mask is removed and the patient is transferred from the operating table to the conveyance cart or bed. While the anesthetist is making final check of blood pressure and pulse, (patient being on transportation cart or bed) the mask is re-applied and the patient is given a final closed-circuit mixture of oxygen, helium and carbon dioxide (which during transfer of patient from table to transportation cart or bed has been prepared by filling the breathing bag with the same as previous flow of 2 liters per minute oxygen, 2 liters per minute helium, 400 cc. per minute carbon dioxide). After breathing this final mixture for a few minutes (until the desired depth of respiration and satisfactory blood pressure have been demonstrated), procedures are discontinued and patient taken to room.

NOTE. The foregoing *recovery* period technique includes helium in the description, as practically all anesthetizing machines possess flow meters through which helium may be administered in the larger flows that are used during de-anesthetization and prophylactic hyperventilation. When the only available flow meters are calibrated for other gases, they may be used satisfactorily for the measured delivery of helium, by the utilization of a suitable calculating flow factor, such as was published in the Bulletin of the American Association of Nurse Anesthetists, May 1939, page 94.

HELEN LAMB

EDITORIAL

When the President of the United States a few months ago proclaimed an unlimited emergency, a large number of the nurse anesthetists throughout the country immediately made known to our organization that they were ready to serve wherever they were needed most, many who had retired also offering their services. Since that time similar letters have been coming in steadily, with a great increase following the sudden and unprovoked attack upon our country.

The history of the nurse anesthetists during the first World War was made illustrious by the brave, willing and unstinted service of many of our pioneer anesthetists in France and other foreign lands, and by the increased labors borne cheerfully in the home lands by the nurse anesthetists. The nurse anesthetists who enlisted with the medical units from various hospitals for service abroad, also contributed much by teaching the use of nitrous oxide and other modern and improved methods of anesthesia in France and other countries. It was undoubtedly due to the courage and ability displayed by our group during that period that the popularity of the nurse anesthetists increased so rapidly following the war.

An opportunity is again offered to our group to show the same loyalty and devotion to our country's cause. So far as we know at this writing, the present status of nurse anesthetists in the Army and Navy is the same as that outlined on pages 232 and 233 of the August, 1941, issue of the Bulletin.

In addition to enlistment in the Army or Navy Nurse Corps, another important way in which the nurse anesthetists can be of help is to do their part in maintaining the efficiency of the Anesthesia Departments in the civilian hospitals by refraining as much as possible from making changes from one position to another. Each of these changes increases the burden upon the other members of the anesthesia personnel for the length of time necessary for new members of the department to become adjusted to their duties; and such dislocations of service render it much more difficult to maintain the high standards for which our organization stands. Each anesthetist who remains faithfully at her post of duty assists in developing a high morale among the large population which each such institution serves. The industrial worker who knows that in time of illness he and his family will receive the highest type of medical, surgical and nursing care, will feel free to throw all his energies into the task of helping to produce more and still more of the essential materials of which our country and its allies are in urgent need. This civilian army which is now laboring at top speed "behind the front," constitutes the first line of the defensive and grand offensive efforts upon which final victory depends.

The American Association of Nurse Anesthetists stands ready to help in every way possible the members of our group, the hospitals, and our Government, and the response already made in recent months assures us that our members are ready and willing to serve to the utmost extent of their ability. The Association is keeping in constant touch with conditions and expects to keep the membership advised of the latest developments affecting our field. It is urged that each member keep us advised of their latest address; and that the officers and committees of each State Association make an effort to enlist in our organization every eligible anesthetist who has not as yet made application for membership.

We believe that nurse anesthetist service is increasingly vital to both civilians and the armed forces in this crisis, and we feel assured that every nurse anesthetist will give the best of which she is capable, acting a part which will redound to her credit and add to the fine record of the pioneers who have gone before.

G. F.

MARY ELIZABETH APPEL
Executive Secretary

Mary Elizabeth Appel, the newly appointed Executive Secretary, received her training in science and journalism at Iowa State College, Ames, Iowa. She was formerly associated with a Chicago metropolitan newspaper, where her duties included the writing of food copy, organizing lecture programs and speaking before

women's clubs—all part of the extensive public relations program carried on by that paper. Prior to that time Miss Appel was director of women's educational activities for one of the nation's leading manufacturers of electrical equipment in Detroit, Michigan, in charge of a staff of eleven trained home economists and educational workers. This position carried her to all parts of the United States, Mexico and Canada, where she organized new educational departments for branches of the firm in key cities, contacted women's clubs and furnished newspaper and magazine editors with a series of articles giving the latest developments and summarizing research data on food and equipment. This brought her in contact with various departments of many of the nation's leading hospitals.

NOTES FROM HEADQUARTERS

MARY ELIZABETH APPEL

Executive Secretary

News reaching headquarters from members everywhere proves that the nurse anesthetist, with the patriotism characteristic of the profession, is redoubling her energies to meet the emergency requirements of the armed forces and the civilian population.

From the War Department, Office of the Surgeon General, Washington,D. C. word has come from Major Julia O. Flikke, Superintendent of the Army Nurse Corps, to the effect that ... "We have at the present time one hundred and five qualified nurse anesthetists in the Army Nurse Corps, thirty-one of whom are Reserves. Thirty-three of this number have been promoted to the grade of chief nurse and serve as instructor, or in the dual capacity of chief nurse and anesthetist in small stations. These anesthetists are assigned throughout the United States, in the Hawaiian, Puerto Rican, and Philippine Departments and in Alaska.

"We are glad to report that Miss Margaret R. Bruchnechter has been appointed to the Army Nurse Corps in the grade of 2nd Lieutenant, and is under orders to report on or about January 16th, 1942, to Walter Reed General Hospital, Army Medical Center, Washington, D. C., for duty. Upon being qualified by written examination, Miss Bruchnechter will be promoted to the grade of 1st Lieutenant, Chief Nurse, Army Nurse Corps, and assigned as an instructor in the administration of anesthesia."

Miss Bruchnechter was graduated from the School of Anesthesia, University Hospitals of Cleveland, in 1937.

COMMENTS FROM MEMBERS

You will be interested in a few comments from members relative to the preparedness program. Typical excerpts from a day's mail may read like this..."Although I am a nurse anesthetist in good standing, I am taking a course of instruction in the newer types of gases so that I may be prepared adequately," or "I have joined our hospital medical unit and may be called upon at any moment."

NEW SCHOOLS OF ANESTHESIA

Mercy Hospital, Chicago. Director, Anna Willenborg.

Miss Willenborg was formerly Director, School of Anesthesia, St. Joseph's Hospital, Chicago, and for four years

Executive Secretary of the American Association of Nurse Anesthetists.

Mount Carmel Mercy Hospital, Detroit, Director, Esther C. Myers, B.S.

Miss Myers is a graduate of the Jewish Hospital School of Anesthesia, Philadelphia, and was Educational Director, School of Anesthesia, Charity Hospital, New Orleans, for three years.

Norwegian American Hospital, Chicago. Director, Edith H. Holmes.

Miss Holmes is a graduate of the University Hospitals School of Anesthesia, Cleveland, Ohio.

SCHOOL SURVEY

The project undertaken by the Committee on Education, to evaluate the courses being given in the various Schools of Anesthesia throughout the country by appointing school survey visitors, is progressing in a satisfactory manner. Even with the increased duties the present crisis has placed on everyone, the detailed and interesting survey reports continue to arrive at headquarters. At the present time more than a third of the schools have been surveyed.

ILLINOIS ASSOCIATION VISITS NEW WESLEY

One hundred and one members of the Illinois Association of Nurse Anesthetists attended open house at the new Wesley Memorial Hospital in Chicago on December 3, 1941, as guests of Dr. Mary Karp, Director of Anesthesia.

From all parts of Illinois eager and enthusiastic nurse anesthetists were delighted with the prospects of visiting one of the country's outstanding hospitals.

Begining on the twenty-third floor, Dr. Karp, assisted by members of her staff, exhibited and explained the facilities on every floor of this beautifully equipped hospital. Since the building is less than a quarter of a mile from Lake Michigan, patients in the solariums on the topmost floors may enjoy the lake breezes along with the sunshine. To the north on the eighteenth floor there is a luxurious open air veranda.

With pardonable pride Dr. Karp directed her guests to the surgical floor with its twelve operating rooms, all especially ventilated and air-conditioned, and to the obstetrical department with its all-stainless steel delivery tables.

Naturally there was intense interest in the newest of the new in gas machines and in the set-up of the anesthesia department.

All floors were viewed down to the necropsy room and the laundry on the lower level. Everyone felt it was a most inspiring and enlightening afternoon and were truly appreciative of Dr. Karp's gracious hospitality.

HEADQUARTERS LIBRARY

Every week brings with it many demands for informational material on anesthesia. In order that the information may be sent out in a simplified manner, an up to date circulating library has been planned, consisting of reprints on current developments in each aspect of the field.

There has long been a need for a technical library at headquarters. This we hope to develop gradually and ask that you assist by sending in any good books you have on anesthesia, not in active use. Won't you please write your name and hospital affiliation on the fly leaf?

SEND IN YOUR IDEAS

In an effort to make your headquarters progressive and of service to all of its members, may we ask that you send in any constructive criticism or ideas that you feel will be of benefit to the organization?

WRITE HEADQUARTERS
RE CHANGE OF ADDRESS

To save time and work for your state secretary, and to keep our records up to the minute, please write headquarters direct in regard to any change of address. On the date your letter is received, we shall notify the editor of the Bulletin and your state secretary.

NEW TRANSFER CARDS

A transfer card form has been developed at headquarters for issuance to state secretaries upon request. This card allows space for detailed information and will also save time for the state secretary.

HELP GET THE NEWS

To make the Bulletin more newsworthy, the headquarters pages in each issue will carry a panel of the latest American Association of Nurse Anesthetist activities.

You are all interested in what is happening to highlight the careers of your fellow members in all parts of the country. With this in mind, won't you help us to bring you news of everyone everywhere by writing in about your new appointments, increased activities, and special developments in your work? Please send this personal news direct to headquarters.

Since headquarters is your national clearing house, let us know about your problems as well as news of your own personal progress.

NOTICE

Because of the shortage of print paper, we are forced to reduce the size of the Bulletin. In consequence, all material will be condensed as much as possible, although we hope to be able to include all programs and announcements necessary to keep our members informed in regard to Association activities in all state and sectional groups.

In Memoriam

Sister M. Camillus, of Mercy Hospital, Valley City, N. Dak., died on September 23, 1941. Sister M. Camillus had been a member of the Association since 1937.

Sister Georgiana Delmore, who had been Chief Anesthetist at St. John's Hospital, Fargo, N. Dak., for eleven years, and a member of the Association since 1935, passed away August 19, 1941, at the age of forty-one years.

ACTIVITIES OF STATE ASSOCIATIONS

SOUTHEASTERN ASSEMBLY OF NURSE ANESTHETISTS

Fourth annual meeting will be held April 9-11, 1942, Hotel Peabody, Memphis, Tenn., in conjunction with Southeastern Hospital Conference.

One session will be devoted to Round Table—members are requested to send or bring in questions for discussion.

Leather secretarial notebook to be presented to State Association having largest percentage attendance; presentation during business meeting Friday afternoon, April 10. Possibly next year the responsibilities of our members may prevent attendance, consequently all are urged to make a special effort to come this year. Guests from other states cordially invited.

For further information write Ida Tedford Ellis, Secretary, 1210 Kuhl Avenue, Orlando, Fla.

Annual meetings of Florida, Georgia and Mississippi Associations same time and place as above.

CALIFORNIA

Meeting held November 11, Franklin Hospital, San Francisco; twenty-seven present. Minutes September meeting corrected as follows: Assessment of $1.00 for active, 75c for associate members, will be levied, payable with dues, to create fund for expense of delegate to annual meeting of American Association. Report of American Association meeting in Atlantic City given by Mabel Cauthorn.

Invitation extended by Eva Wilson to meet in January at Peralta Hospital, Oakland.

COLORADO

Third annual meeting held at Presbyterian Hospital, Denver, November 13, 1941. Mr. William Olson, President of Liberal Arts College, Denver University, talked on "The Americas - Our Neighbors."

Officers Elected:

President	Ann McDonald Stevens 4040 East 17th Ave., Denver
First Vice-President	Henrietta M. Moon 950 Marion St., Denver
Second Vice-President	Louise B. Allen 1212 Cherry St., Denver
Secretary-Treasurer	Virginia Murray Presbyterian Hospital, Denver
Trustee, 3-year	Ethel F. Currie 429 Remington St., Fort Collins

FLORIDA

Annual meeting held at San Juan Hotel, Orlando, November 15, 1941, Marjorie L. Watts presiding. Reports of the convention held in Atlantic City and Southeastern Assembly in New Orleans, given by Alpha Schier, Ida Tedford Ellis and Evon Compton.

All members are urged to attend Southeastern Assembly, April 9-11, in Memphis. Mae Stroud, St. Vincent's Hospital, Jacksonville, will give paper on "Endotracheal Anesthesia."

Officers Elected:

President	Alpha E. Schier Halifax District Hospital, Daytona
Vice-President	Mary C. Brown 1501 N. W. 2nd St., Miami
Secretary-Treasurer	Mary F. Phillipoff Morton Plant Hospital, Clearwater
Trustees	Ida Tedford Ellis Ruth B. Dunning

ILLINOIS ASSOCIATION MEETING

Front row, first, left to right, Nelle G. Vincent, President Illinois Association
Third row, third from left, Hugh O. Brown, M.D.

ILLINOIS

A meeting was held at St. Joseph's Hospital, Chicago, December 2, with sixty present. Following greetings by Dr. F. B. McCarty, Chief of Staff, Dr. Hugh O. Brown, Director of Anesthesia, Cook County Hospital, Chicago, spoke on "Anesthesia in Thoracic Surgery."

Mary E. Appel, Executive Secretary of American Association, spoke on activities at headquarters and offered various suggestions for state organization work. Ann Priester gave report of meeting in Atlantic City.

IOWA

October meeting held at Iowa Lutheran Hospital, Fort Dodge.

Annual meeting will be held in conjunction with Iowa Hospital Association, April 27-29, 1942, Fort Des Moines Hotel, Des Moines. For further information write Sylvia Abraham, Secretary, Mercy Hospital, Council Bluffs, Iowa.

MASSACHUSETTS

Massachusetts Association met November 2 at Masschusetts General Hospital, Boston. Dr. Howard Elliot, Resident Anesthesia Department, Massachusetts General Hospital, talked on methods of anesthesia in India, where he spent nine years in charge of a mission hospital.

Five dollars from treasury was donated to Red Cross.

MINNESOTA

Thirty-three were present at meeting held at Minneapolis General Hospital October 7. Palma Anderson gave report of Advisory Council sessions held in Atlantic City. Mr. H. J. Berg, Jr., Ohio Chemical Company, presented excellent technicolor film of Minneapolis Aquatennial.

On October 28 at Miller Hospital, St. Paul, Mary Janovich and Hazel Peterson gave joint report of Atlantic City convention.

Dr. Paul Larson spoke on "Anesthesia in Obstetrics and Gynecology" at Northwestern Hospital, Minneapolis, on November 25.

The Minnesota Association is planning another series of lectures on anesthesia, and a questionnaire has been sent to each member in regard to choice of topics. The course will be held at the Center for Continuation Study, University of Minnesota, in March or later. For further information write Katharine Jurgensen, Swedish Hospital, Minneapolis, Minn.

PENNSYLVANIA

EDITH DAVIS
President

Officers elected, District No. 1

President
Gertrude Clarke
Chestnut Hill Hosp., Philadelphia

First Vice-President
Edith K. Redelberger
1512 W. Louden St., Philadelphia

Second Vice-President
Margaret Lane
Presbyterian Hosp., Philadelphia

Secretary-Treasurer
Margaret Knipper
St. Joseph's Hosp., Philadelphia

The annual meeting of the Pennsylvania Association will be held April 15-16, 1942, at William Penn Hotel, Pittsburgh. For further information write Helen Young Walker, Secretary, 1824 Wallace St., Philadelphia.

PROGRAM—EIGHTH ANNUAL CONVENTION

MID-SOUTH POST GRADUATE NURSE ANESTHETISTS' ASSEMBLY
and
TENNESSEE ASSOCIATION OF NURSE ANESTHETISTS

February 11-12, 1942, Hotel Peabody, Memphis, Tenn.

Wednesday, February 11

9:00 A.M. Registration

10:00 Invocation—The Reverend Lud Estes
Address of Welcome—Henry Hedden, M.D., Memphis
"Pentothal Sodium Analgesia in Urology"—Reed N. Nesbit, M.D., Ann Arbor
"Anesthesia in Thyroidectomy"—Warren H. Cole, M.D., Chicago

12:00 LUNCHEON

1:15 P.M. BUSINESS SESSION
Mid-South Post Graduate Nurse Anesthetists' Assembly

2:30 "Choice of Anesthetic in Anal, Rectal and Sigmoidal Surgery"
Harry E. Bacon, M.D., Philadelphia
"Sodium Pentothal-Oxygen Anesthesia: The Danger of Promiscuous Use; Importance of Efficient Postanesthetic Nursing Care"—
Ann Beddow, St. Joseph Hospital, Memphis

7:30 BANQUET — SKYWAY

Thursday, February 12

9:00 A.M. Clinic—St. Joseph's Hospital
Demonstration of Sodium Pentothal — Ann Beddow
"Anesthesia in Obstetrics" — James M. Brockman, M.D., Memphis

12:00 LUNCHEON

1:15 P.M. "Oxygen Therapy"—Mary E. McCue, Baptist Hospital, Memphis
"Special Problems in Administering Anesthetics to Children"
Stanley Gibson, M.D., Chicago
"Anesthesia in Orthopedics" — Byron S. Talley, M.D., Memphis

3:15 BUSINESS SESSION
Tennessee Association of Nurse Anesthetists

TEXAS

PROGRAM—ANNUAL MEETING

Houston, Texas - February 27-28, 1942

Friday, February 27

7:30 A.M. Meeting — Board of Trustees

8:30 Registration

9:00 Presiding—Marcella A. Cable, Herman Hospital, Houston
Invocation—The Rev. R. A. Deison, Third Presbyterian Church, Houston
Address of Welcome—Mr. Robert Jolly, F.A.C.H.A., Memorial Hospital, Houston
Greetings—Josie Roberts, F.A.C.H.A., Methodist Hospital, Houston

Address—Mr. Harry G. Hatch, F.A.C.H.A., Northwest Texas Hospital, Amarillo

Greetings from the Texas Anesthetists—Minnie V. Haas, Fort Worth

Address—S. E. Stout, M.D., Harris Clinic, Fort Worth

"Cyclopropane as an Obstetrical Anesthetic"—Winnifred Hackworth, St. Joseph's Infirmary, Houston

"Anesthesia in Thoracic Surgery"—Howard T. Barkley, M.D., Houston

Round Table—Conducted by Sallie F. Knight, Baylor University Hospital, Dallas

12:00 Luncheon—Empire Room, Rice Hotel

1:00 P.M. BUSINESS MEETING—Presiding, Minnie V. Haas, President

1:45 Report of Atlantic City convention—Cassie D. Shievers, Red River County Hospital, Clarksville

2:00 JOINT SESSION WITH TEXAS HOSPITAL ASSOCIATION

Panel on Professional Services—conducted by George Hilliard, M.D., Baylor University Hospital, Dallas

3:00 Meeting — Board of Trustees

7:00 Banquet with Texas Hospital Association—South American Room, Rice Hotel

Saturday, February 28

Morning Clinics in various hospitals

ASSOCIATION PINS NOW AVAILABLE

Your committee has finally completed its mission of incorporating the seal design in letterhead and Bulletin cover, and its development as a pin which we hope will please the eye, and hope even more fervently, that it will serve as a constant reminder of the purpose of our work, stimulate us to better effort and lead to greater appreciation of the fellowship we enjoy in the organization for which it stands.

Our purpose as anesthetist, which we conceive to be "Watchful Care of the Sleeper Given by the Light of the Lamp of Learning" is symbolized in the seal and pin by characters selected from Greek mythology. Those chosen are Hypnos, the God of Sleep, who was described as a half grown boy. He daily retired to a ledge in the Cave of Night to seek his rest. To foster sleep and pleasant dreams, he took with him a bunch of poppies, which he continued to hold in his hand, even in slumber so profound that his arm slid off the ledge.

Morpheus, the versatile God of Dreams, was delegated to watch over Hypnos as he slept, to fend off harm and insure pleasant dreams. In the seal he is shown holding aloft the Lamp of Learning by the light of which he keeps his vigil.

This legend, interpreting the design, will be wrapped with each pin, with the thought that knowing the story which inspired the design will add to its enjoyment.

Priorities on the gold stock go into effect in March; therefore those desiring a pin should place their orders by March 10th, as no one now knows how severe the Federal restrictions on the metal will be in the future.

For your convenience, an order blank will be found in this issue of the Bulletin. Anesthetists having the same address may group their orders for shipment.

Respectfully submitted,
Esther Meil
Exire O' Day
Louise Schwarting, Chairman
Seal Committee

Order blank for Pin on page 52.

ORDER BLANK

AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

OFFICIAL EMBLEM

1/10 10 K. Gold
Price — $4.00
(includes mailing)

If pin is desired, please fill out this form and mail with remittance to:

American Association of Nurse Anesthetists,
18 East Division Street, Chicago, Illinois.

NAME...

STREET ADDRESS...

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HOSPITAL...